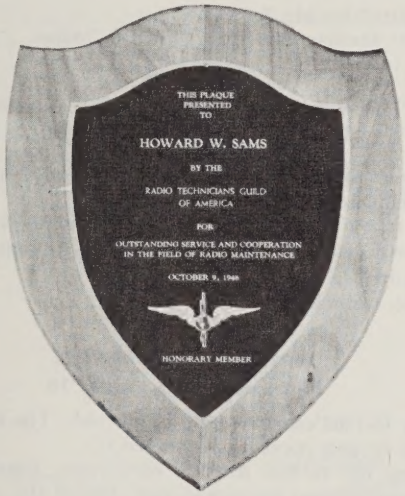
CONTENTS

TRADE NAME	MODEL	FOLDER NO.
TELEVISION COURSE—INSTALLMENT No. 13		
Aircastle	G-725	4820-1
Aircastle	9	4820-2
Air King	A-625	4820-3
Crosley	9-102, 9-118W	4820-4
Crosley	9-119, 9-120W	4820-5
Detrola	611-A	4820-6
Garod	900, 1000, 1100, 1200 Series	4820-7
Globe	559	4820-8
Hoffman	C-503, C-513	4820-9
Majestic	6FM714 (Ch. 6B02D)	4820-10
Masco	MA-17N, MA-17PN	4820-11
National	HRO-7R, HRO-7T	4820-12
Philco	49-1600	4820-13
RME	DB-22A	4820-14
Radioette	PR-2	4820-15
Regal	CR761	4820-16
Silvertone	8160 (Ch. 109.636), 8160A (Ch. 109.636A)	4820-17
Sparton	4AW17 (Ch. 417)	4820-18
Stromberg-Carlson	1220 Series	4820-19
Tele-Tone	165 (Ch. Series AG)	4820-20
Truetone	D4842 (Fact. No. 26C21-81)	4820-21
Westinghouse	H-202, H-204 (Ch. V-2128-2)	4820-22
Willys-Overland	8030	4820-23

The PHOTOFACT Servicer

NOV. 15, 1948 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ VOL. 5, No. 50

ROBERT M. ELLIS, *Editor*



HOWARD SAMS HONORED

At a banquet on Saturday night, October 9th, at the Locust Lawn Cafe, Ionia, N. Y., Howard Sams received the plaque pictured above from the Radio Technicians Guild of America. The presentation was made by Bertram Lewis of the Rochester Chapter. Delegates from the several Radio Technicians Guilds in the State of New York and the New England States were present.

In expressing his appreciation for this signal honor, Mr. Sams said he was accepting it for his organization with a sense of deep gratitude. He claimed no personal credit, but pointed out that only the combined efforts of a group of highly trained specialists, each of whose sole aim was to be of utmost service to the Radio Service Industry, made possible the organization which produces PHOTOFACT Publications.

Al Saunders, who acted as toastmaster at the banquet, was surprised and delighted to receive a life membership in the Rochester Guild. Paul Wendel and your editor also were presented with honorary membership certificates.

On Monday, October 11th, Al Saunders gave his famous television servicing talk before a capacity crowd in Studio "A" at Rochester Radio City. This beautiful studio which seats about 400 people was made available to the Rochester Radio Guild through the courtesy of Mr. George Driscoll, FM director of Station WHFM. There was a capacity crowd to hear Al's talk. We have been informed that it was one of the largest gatherings ever to attend a service meeting in Rochester.

★ ★

GOLDEN ANNIVERSARY?

In numbers rather than years we're celebrating kind of a Golden Anniversary. This issue is PHOTOFACT Folder Set No. 50.

Fifty issues ago we had only an idea and an ambition, with no precedent for accomplishment. The idea was that the radio service profession needed a really complete technical data service—one that would give all information necessary to do a "bang-up" job of servicing with less work and worry; one that would be uniform for all makes of sets; and one that would be complete with tested replacement parts listings. Our ideal was to publish the most helpful possible technical data.

PHOTOFACT service started with a nucleus of twelve employees—now there are one hundred and three who derive their livelihood from PHOTOFACT Publications. When we started, the radio industry seemed to be running in high gear on one product only—five-tube "stinkerdynes." FM was changing from low band to high band, and was actually starting over again from scratch. Television was not much more than a laboratory curiosity on the Atlantic Seaboard, elsewhere it was unknown.

But in two short years how the situation has changed! Consoles are available in every retail radio store. FM service has become almost as common as AM, providing clear reception both in static ridden cities and in rural localities where sky-wave transmission had made every AM channel a hodge-podge of heterodynes and interference. Television has expanded to the point where industry-wise it has become the dog that wags the radio tail. Even the phonograph industry has refused to "stay put"—new "Microgroove" records requiring special pickups and turntables play six times as long!

The picture is one of complexity, increasing at a dizzy pace. We were committed to keep you up-to-date with this industry progress. At times the magnitude of the task seemed to make the job impossible of accomplishment, but we pushed bull-doggedly ahead. Originally we had only our AM receiver analysis line. Then we added FM, a record changer department—our clinic—our manufacturers' service division; important because it helps provide you with newer and better services—and finally our new television analysis line for the production of PHOTOFACT Folders on TV sets, where the special features of PHOTOFACT presentation promise to save even more time and effort for you.

In addition you told us your need for several specialized books, and we brought them to you—The Record Changer Manual, the Dial Cord Stringing Guide, the Radio Receiver Tube Placement Guide, all Howard Sams publications that are designed to simplify your work and make it easier for you.

All this has been done within the short space of our first fifty issues. We breathe easier because we now have a wealth of precedent to guide us. With your help we are giving you the technical data service you have always wanted. We don't know whether we can consider our fiftieth issue a Golden Anniversary—but we do know there is a golden future for service technicians because of the many new opportunities for profitable enterprise.

★ ★

RECTIFIER LOAD CURRENT

Several patrons have suggested it would help them to diagnose radio trouble if we would publish the load current of the rectifier tube. This information is listed for all sets using a power transformer, but our patrons apparently have not been looking in the right place for it.

Naturally, the load current on the rectifier tube is exactly the same as the load on the high voltage power transformer secondary center tap—these are simply opposite ends of the same circuit. Accordingly, if you want to find the load current on the rectifier tube just refer to the power transformer secondary rating. The listing will be in one of the following forms, for example:

500 V CT 500 V CT
or
.055 A DC @ .055A.

The current rating in either case is the DC load current.

PHILCO CUSTOM AUTO SETS

Effective in Cumulative Index No. 10 of this issue, Philco custom auto sets will have a dual listing. The index will show these sets under both the motor car manufacturer's model number and the Philco model number.

We believe you will welcome these additional listings. Because the Philco number often appears on the chassis, the natural tendency is to think of the set as a Philco, rather than a Mopar, Studebaker, Packard, or whatever the case may be.

★ ★

FIELD EXPERIENCES

Here is your opportunity for passing practical service experiences to others for the benefit of all. For every service "Field Experience" published, we issue to the author a certificate that is good for one PHOTOFACT Folder Set. Since it is impossible to verify the accuracy of contributions, we cannot be responsible for either the diagnosis made of the receiver trouble, or the results which will be obtained by following the suggested repair routine. All contributions become the property of Howard W. Sams & Company, Inc.

★ ★

SILVERTONE 6220—6220A
Photofact Set 9, Folder 30

"Complaint: Set does not play. All voltages check o.k.

"Tapping the .005 mfd. audio coupling condenser Item 8 in the grid circuit of the 1LB4 would start the set playing; but this condenser was not open or shorted.

"The trouble was not in PHOTOFACT Item 8, but in Item 20, the .0001 mfd. r.f. coupling capacitor, which tapping would not affect. I have found this trouble in three sets."

Submitted by: Mr. Carl G. Thomas, Sandy Bottom Appliance Co., 3 Notch Road, Hollywood, Maryland

★ ★

ZENITH 9HO79, 9HO79E, 9HO79R, 9HO81, 9HO82R, 9HO85R, 9HO88R
Photofact Set 7, Folder 34

"Complaint: Intermittent on record player only. The signal will come back if the 'off-manual-automatic' switch is turned off and on again.

"Check the phonograph oscillator coil, PHOTOFACT Item 112, for an intermittent open circuit at one end of the coil, where the wire fastens to the coil lead. This connection may not be soldered.

"Remedy: Carefully remove the wax from both ends of the oscillator coil, and with a hot iron apply solder to the coil leads. Cover with a small amount of speaker cement. The intermittent will be cured."

Submitted by: Mr. Arthur E. Dibble, New Albany, Pennsylvania

★ ★

OSCILLATION IN 1946-48 PHILCO AC-DC SETS

"An intermittent, open or short of the 0.2 mfd. 400 volt resonant line isolation condenser will cause oscillation. Accordingly in complaints of this kind it is wise to check this condenser first. In addition, check the three-section filter. It may develop leakage to the chassis, and this will cause feedback from B— to the chassis. Examine the heater terminal soldering. Also check the tuning condenser for leakage."

Submitted by: Mr. Joe Wunderlich, 236 West Brooks, Galesburg, Illinois

★ ★

ZENITH 5DO11
Photofact Set 3, Folder 17

"Symptoms: Slight distortion, and low output. All voltages checked normally, and the alignment was peaked for highest volume.

"Cause: The output transformer primary checked 140 ohms as against 150 ohms specified in the 'PHOTOFACT.'

"Remedy: A new transformer brought the output up to normal."

Submitted by: Mr. Earl E. Brehmer, Brehmer's, 2500 N. W. 36th St., Miami, Fla.

★ ★

PHILCO 38-12

"Complaint: Gradual drifting in and out of resonance.

"We found the screws holding the gang condenser had worked loose. Pressure on the dial plate by the cabinet caused the condenser to shift."

Submitted by: Mr. Jay C. Gilbert, Gilbert Electric, Box 1336, Bancroft, Idaho

★ ★

EMERSON 535
Photofact Set 20, Folder 9

"The heaters of all tubes but the 12AT6 would light, yet the set had series filaments!

"I found that the tube socket terminals had pushed through the socket and were shorting around the filament prongs."

Submitted by: Mr. Glenn W. Young, Blythe, California

★ ★

PHILCO 48-1262, 48-1282
Photofact Set 35, Folder 18

"A Philco 48-1262 came in with a bad hum. The filter condensers and cathode by-pass condensers checked o.k.

"Separating the voltage doubler condensers, PHOTOFACT Items 7 and 8, restored normal operation. Just discard the metal strip that holds these condensers in place; or a better way would be to replace them."

★

PHILCO 47-1230
Photofact Set 22, Folder 23

"The tracer shows a signal in the output of the 7F8, but the grid of the 6BA6 first I.F. will not tune. Replace the 6 mmf. mica condenser inside the first I.F. transformer, Item 145. The grid may not show a positive potential, but testing probably will show a high leakage, about ten megohms."

Submitted by: Mr. Tom Llewellyn, Serviceman, Tupelo, Mississippi

IMPORTANT NOTICE

Starting with Set 48, please refile your television Folders in their proper place within the Set, alphabetically and numerically, as listed in the envelope and separator indexes. This change will provide you with instant access to your T.V. Folders.

Within each PHOTOFACT Set we try to arrange the Folders in alphabetical order; and when so sorted the Folder numbers will run consecutively. For example, in Set 48, the Hallicrafters S-52 of Folder No. 9 logically follows the Garod 306 in Folder No. 8. The advantages of this arrangement are at once apparent.

Unfortunately, the mechanism of collating and punching a television Folder is quite different from that of a receiver Folder; so that it becomes mandatory we place the Television PHOTOFACT at the very back of each Set. The slight effort of moving the TV Folder forward to its proper position will be amply compensated by the convenience of having the Folder sequence agree with the Index.

We're leaving no stone unturned to add every possible improvement to PHOTOFACT Folders. We are here to help you.

THE BROADBAND ANTENNA PROBLEM (Continued)

A Non-Parallel Dipole. The "V" type antenna, in its simplest form, consists of a dipole whose elements are not in a straight line, but are positioned at an angle of less than 180 degrees (in other words, "V" shaped). The effect of moving the dipole elements from a straight line is to broaden the band and still retain the directional pattern. Figure 159A shows the "V" antenna in its simplest form. Figure 159B shows a modification of the "V" antenna known as the "Double-V" which, due to the parallel operation of the dipoles, shows an increased impedance and matches 300 ohm transmission line.

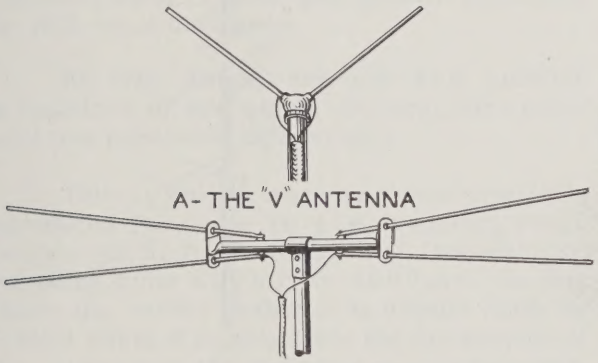


Fig. 159. The "V" and "Double-V" Variations of the Dipole Antenna. (B) Courtesy Technical Appliance Corp.

Special Dual Element Combinations. Dipole combinations, in which the high frequency element is a physical extension of the low frequency element, can be made to exhibit wide frequency response. Many variations of this type of construction are appearing on the market, a number of which are illustrated in Figures 160A, B and C. Such antenna structures can also be used with reflector elements, as shown in Figure 160C. Their characteristics include wide band response, desirable directional patterns, and attenuation of the FM region. Certain of these antennas use balancing transformers, consisting of short lengths of coaxial cable, which aid in matching the transmission line.

"STACKED" ARRAYS. Any type of antenna can be used in a "stacked" arrangement in which a second identical antenna is erected directly above the first and in the same vertical plane. The antennas are positioned at

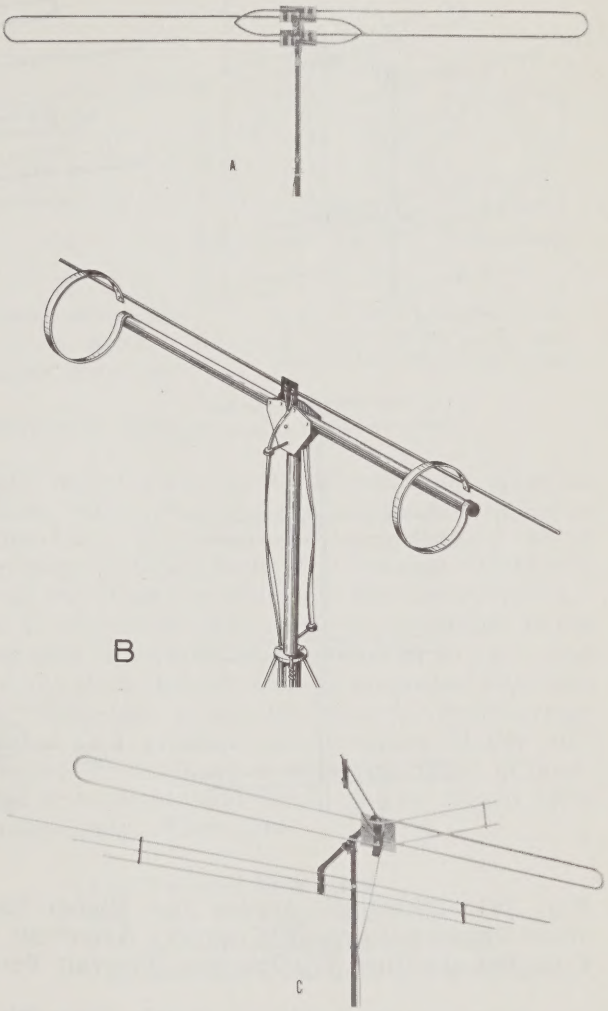


Fig. 160. Dual-Element, Wide Band, Television Antennas. (A) Courtesy Dielectric Products Co. (B) Courtesy Tricraft Products Co. (C) Courtesy L. S. Brach Manufacturing Corp.

a critical spacing (usually one half wavelength), which provides in-phase operation to a common transmission line. The advantages of vertical stacking are twofold.

1. Additional gain is obtained due to the contribution of the added antenna.

2. Some vertical directivity is contributed by the mutual interaction of the antennas which discriminates against a reflected wave from the ground and confines the reception to the direct or sky wave. Figure 161 illustrates several versions of vertically stacked arrays.

ROTATABLE ANTENNAS. From the discussion of multiple path reception difficul-

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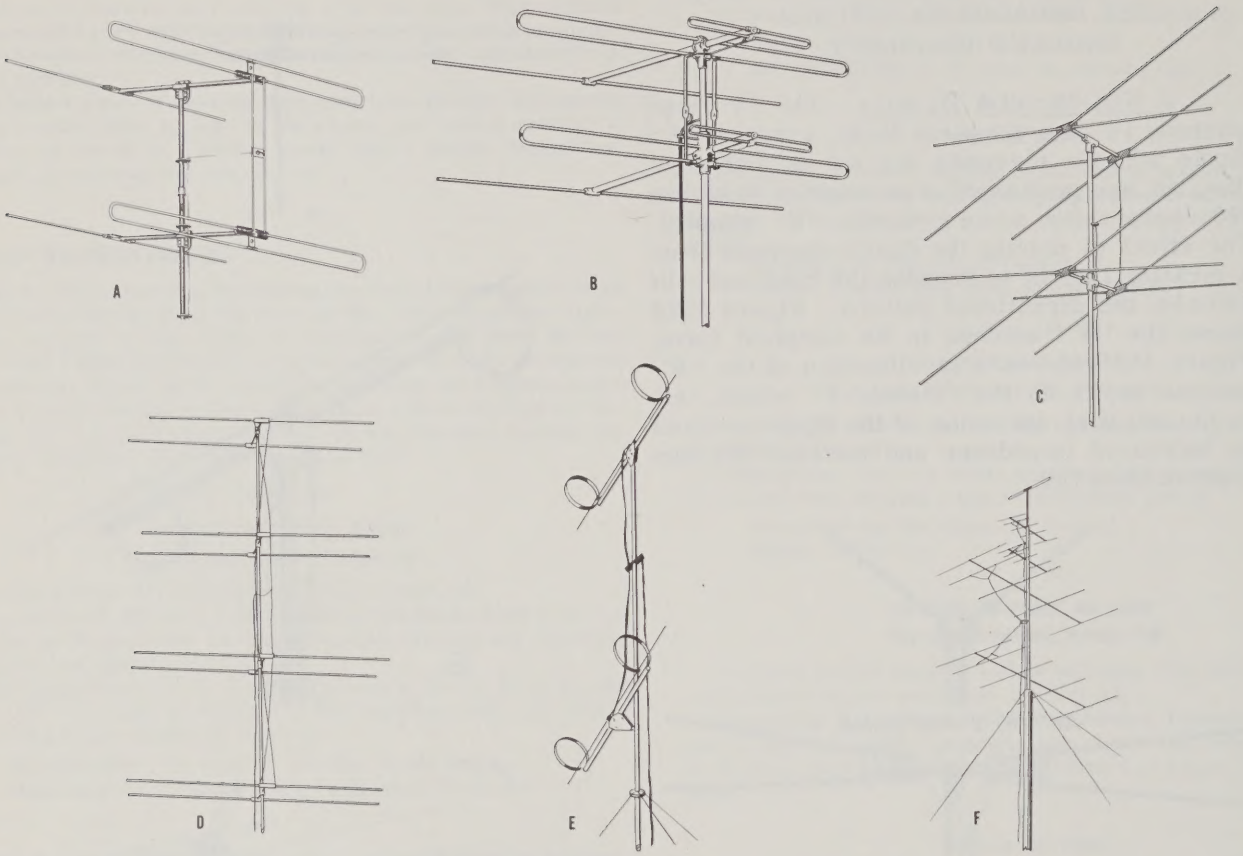


Fig. 161. "Stacked" Arrays for Higher Gain and Improved Directional Pattern. (A) Courtesy Ward Products Corp. (B) Courtesy American Phenolic Corp. (C) Courtesy Telrex Co. (D) Courtesy Cole-Worner Corp. (E) Courtesy Tricraft Products Co. (F) Courtesy Esse Radio Co.

ties, it is evident that a highly desirable feature for a television antenna would be the ability to rotate it to different positions as conditions might require. Figure 162 shows a remotely controlled, motor driven antenna which accomplishes this result. It consists of two half-wave dipoles positioned at right angles to one another. The longer dipole is cut for the average frequency of the low frequency band, while the shorter dipole is tuned to the average frequency of the high band. A motor, housed within the antenna structure, allows rotation of the structure for optimum reception. Motion is accomplished by a control box located at the receiver. Slip-ring construction allows the antenna to be continuously rotated. On alternate 180 degree positions, the mechanism at the base of the antenna automatically switches from one band of TV frequencies to the other.

Other types of rotators are available which provide remote indication of the antenna position. With these devices the user may "log" the best position of the antenna for any given station, and subsequently return the antenna to the proper position.

THE CORNER REFLECTOR ANTENNA. Figure 163 shows an antenna structure which

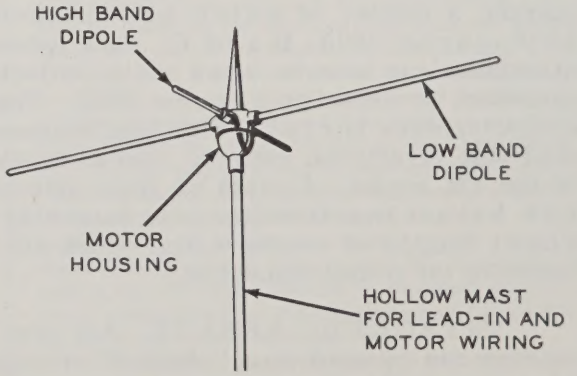


Fig. 162. Motor Driven Remote Control Antenna. Courtesy Kings Electronics.

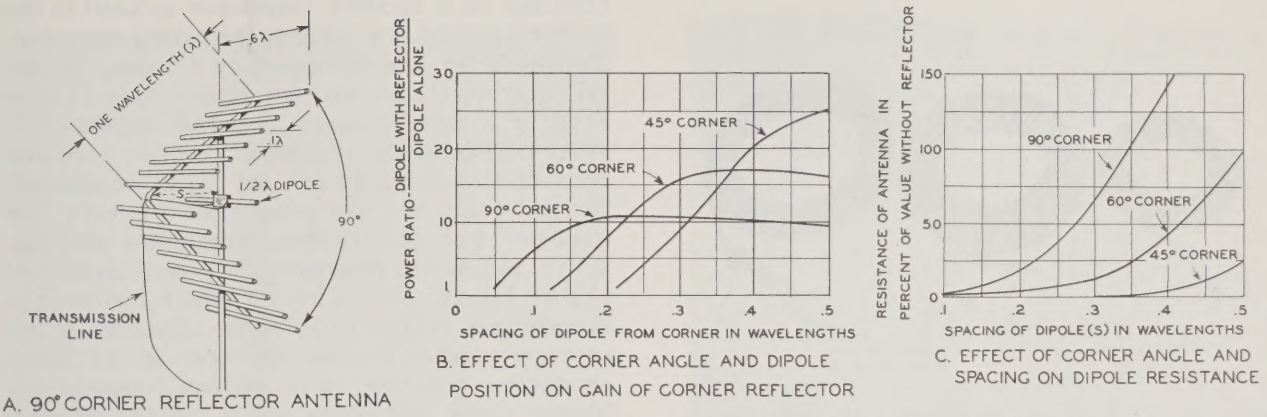

ONE WAVELENGTH (λ)
.6λ
.1λ
1/2 λ DIPOLE
S
90°
TRANSMISSION LINE
A. 90° CORNER REFLECTOR ANTENNA
POWER RATIO- DIPOLE WITH REFLECTOR / DIPOLE ALONE
45° CORNER
60° CORNER
90° CORNER
SPACING OF DIPOLE FROM CORNER IN WAVELENGTHS
B. EFFECT OF CORNER ANGLE AND DIPOLE POSITION ON GAIN OF CORNER REFLECTOR
RESISTANCE OF ANTENNA IN PERCENT OF VALUE WITHOUT REFLECTOR
90° CORNER
60° CORNER
45° CORNER
SPACING OF DIPOLE (S) IN WAVELENGTHS
C. EFFECT OF CORNER ANGLE AND SPACING ON DIPOLE RESISTANCE

Fig. 163. The Corner Reflector Antenna

is of interest because it has a very high "front-to-back" ratio and greatly increases the pick-up of the dipole.

Its size, weight, and cost are justified in locations of low signal strength, high noise level and excessive interference.

This type of antenna was originally introduced for use in the frequency range known as U. H. F. (Ultra high frequencies), extending from 300mc to 3000mc. In this range, the corner reflector is usually made as a solid sheet of metal, since the dimensions of the dipole and the reflector are conveniently small.

When applied to the V. H. F. television region, a solid metal reflector would be exceedingly massive and easily damaged by high winds. It has been found that the solid sheet can be replaced by a "grid" of rods made longer than the dipole element, and spaced closer than .1 wavelength, as shown in Figure 163A.

Figure 163B shows the gain or ratio of power received with the reflector, to power received with the dipole alone - for various spacings of the dipole from the corner, and for corner angles of 90 degrees, 60 degrees, and 45 degrees. Figure 163C illustrates the influence of the corner reflector on the impedance of the antenna. This has been expressed in percentage change of dipole impedance since the corner reflector can be used with any type of dipole.

TYPES OF TRANSMISSION LINES: In our discussion of ghosts produced by reflections in lead-in or transmission line, we have indicated that maximum power transfer and freedom from reflections occur when the transmission line has a characteristic impedance which exactly matches both the antenna resistance and the input resistance of the radio receiver. It is important that the power developed in the antenna structure be transferred to the grid of the first radio frequency amplifier tube with as little loss as possible in order to over-ride noise and produce high-contrast, steady pictures. To accomplish this, four types of lead-ins or transmission lines have been used extensively. These are:

The Twisted Pair Line.
The Two-Wire Parallel Line.
The Coaxial or Concentric Cable.
The Shielded Two-Wire Parallel Line.

Each of these types exhibits its own particular characteristics of impedance range possibilities and loss or attenuation per foot.

THE TWISTED PAIR LINE. This type of transmission line is similar to twisted lamp cord but is made of higher grade insulation and weather proof covering. It is the most economical type of lead-in, but possesses several disadvantages. Its impedance is normally in the range of 100 to 300 ohms, depending upon the size of wire used and the thickness of the insulation. The losses are fairly high and the line is subject to deterioration by weather and dirt. Its use has been supplanted, in most instances, by more efficient types of lines.

THE TWO-WIRE PARALLEL LINE. The most popular type of television lead-in consists of two-stranded wires molded parallel to each other, at a uniform spacing, in a flat strip of insulating material. This low-loss material,

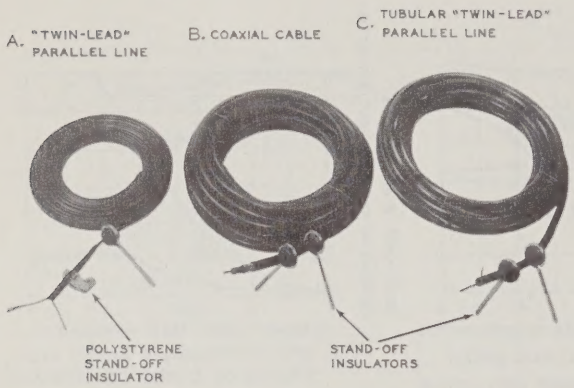


Fig. 164. Typical Television Transmission Lines. Courtesy American Phenolic Corp.

a plastic known as polyethylene has excellent radio frequency properties including high resistivity low water absorption and low dielectric constant. It is commercially available in impedances of 75, 150 and 300 ohms, which provide a match for any of the types of antennas discussed. Parallel wire lead-in is available in both clear and brown colored plastic. Each type is equally efficient. The color has been added, in the case of the brown cable, to mask a slight color change which appears with aging of the transparent cable. Figure 164A shows this type of parallel lead-in cable together with two different types of stand-off insulators. Both types of insulators are used to support the cable away from buildings, and to keep it from twisting. The only disadvantage in the use of parallel lead cable is the fact that it is not shielded and therefore can pick up man-made noises from electric equipment and automobile ignition.

A recently introduced variation of this type of parallel line consists of two wires which are molded diametrically opposite one another in the side walls of a hollow plastic tube. The advantages of this construction are: (1) the leakage path has been increased, (2) the dielectric between the wires is substantially in air and, (3) the spacing between the wires (the diameter of the tube) can be smaller for a given characteristic impedance than the width of comparable ribbon type. Its construction decreases the loss per foot and improves the performance, especially in wet weather. Figure 164C shows such a tubular two-wire line together with the stand-off insulators designed to support it.

COAXIAL OR CONCENTRIC CABLE. Coaxial cable, as used for television lead-ins, consists of a flexible conductor molded in the center or axis of a solid polyethylene cylinder. This cylinder is surrounded by a copper braided outer conductor and the entire cable is covered by a weather-proof vinylite sheath. The outer conductor is grounded at the receiver and acts as a shield for the inner conductor. Coaxial cable has the properties of very low loss per foot and freedom from noise pick-up. It is made in characteristic impedances of from 50 to 150 ohms. The impedance is determined by the ratio of the diameter of the outer conductor to the diameter of the inner conductor and, for this reason, impedances higher than 150 ohms would require either a large outer diameter or an extremely small and weak inner conductor. Figure 164B shows a sample of coaxial cable with the various layers cut back to show the construction. The coaxial cable is an unbalanced type of line, and if the receiver is designed for a balanced input with a grounded center tap, it may be necessary to remove the ground connection before connecting the cable.

SHIELDED TWO-WIRE PARALLEL LINE. This type of construction is similar to the coaxial cable except that two conductors, equally spaced from the center, are molded in the solid dielectric. Such a line is balanced since the outer conductor is merely a shield and can be connected to ground, while the two inner conductors can be connected to the balanced input of the receiver and to the dipole. The losses per foot are higher than coaxial cable of the same impedance and the impedances, commercially available, are from 40 to 100 ohms. It is especially valuable for short transmission lines in unusually noisy locations.

TELEVISION RECEPTION IN FRINGE AREAS: The service area of the television transmitter is normally considered to be a contour in which the signal strength is 200 microvolts per meter, or higher. This contour depends upon a number of factors which include the power of the transmitter, the height of the transmitting antenna, the topography of the land, the effect of shielding by buildings and other structures, and the height of the receiving antenna.

Television reception at points beyond the radio horizon (see Figure 147) is not reliable, and for this reason many of the television manufacturers have restricted the sale of television receivers to areas in which reliable performance can be anticipated. How-

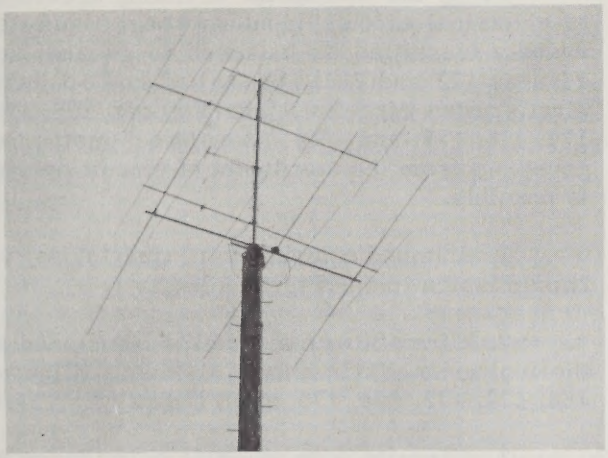


Fig. 165. Multi-Element "Yagi" Antennas. Courtesy Mr. Elmer Tafflinger.

ever, the competitive nature of the radio business, as well as the intense public interest in television, is resulting in the sale of receivers in localities beyond the defined service area of transmitters. The Federal Communications Commission has granted higher power licenses to "rural stations" for service areas larger than metropolitan coverage. Long distance reception is being attempted with these stations. The radio service technician should realize that operation in these fringe areas cannot be guaranteed and is subject to the vagaries of transmission due to weather conditions and other effects, not completely understood. Extensive experimentation is being conducted in fringe areas and the following suggestions are offered for the experimentally minded technician:

1. Highly efficient antenna structures, such as four and five element arrays (see Figure 165), will assist in increasing the signal pick-up. Such arrays are used primarily for a single channel reception.

2. As shown in the nomograph of Figure 147, the radio horizon is increased by additional height at the receiving location. Towers for this purpose are commercially available. Representative types are shown in Figure 166.

3. Television boosters can provide additional RF gain.

Care should be exercised to insure a sufficiently wide band for reception of the channel. The addition of the selectivity of a "booster" to that of the multi-element array

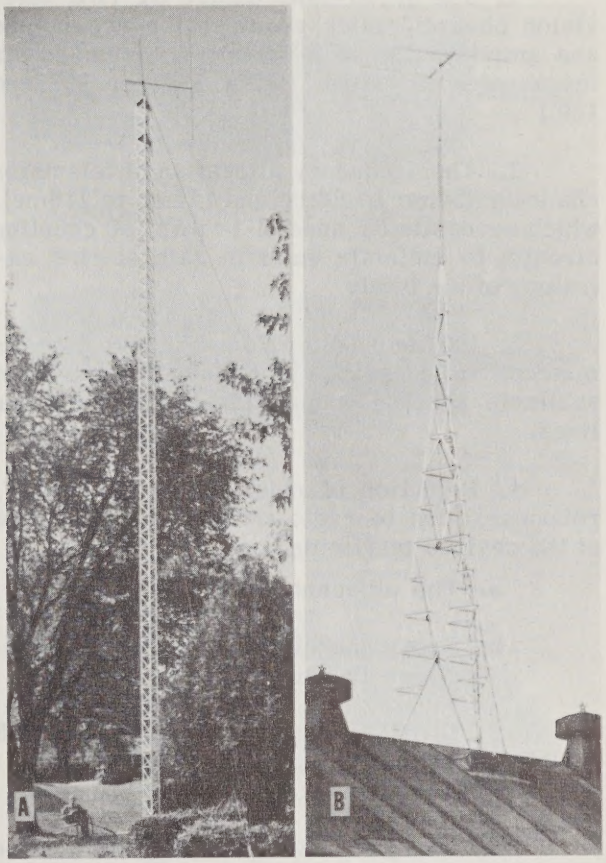


Fig. 166. Special High Tower Assemblies for Fringe Area Reception. (A) Courtesy A-1 Radio Tower Co. (B) Courtesy Wind Turbine Co.

may harm the quality of the received picture. The band width may be restricted to such an extent that the sound channel suffers from attenuation or that picture quality is impaired.

TELEVISION INPUT TUNING SYSTEMS

The RF section of the television receiver, shown in the block diagram of Figure 144 as items Nos. 2, 3 and 4, consists of a radio frequency amplifier stage, a converter or first detector stage, and a local oscillator. This combination of circuit elements performs the same function as its counterpart in a conventional broadcast or short wave superheterodyne receiver.

A number of factors, not encountered in the reception of ordinary broadcast signals, require a more complicated design than is found in standard broadcast sets. Among these are:

1. The broad-band nature of the television channel, which requires the acceptance and amplification of a band of frequencies six megacycles in extent. (See Figures 137 and 139.)

2. The frequency allocation of television channels (54mc to 88mc and 174mc to 216mc), which necessitates special types of coupling circuits to maintain uniform gain at the extremes of the bands.

3. Balanced types of input circuits matched in impedance to the characteristic of available parallel lead or coaxial transmission lines.

4. Rejection of undesired or "spurious" responses, due to radio transmissions outside of the desired television band.

   a. The adjacent channel sound carrier.

   b. Cross modulation due to other television channels.

   c. Direct transmission, through the RF system, of signals at the intermediate frequency.

   d. Images due to other television channels and to FM stations.

   e. Overloading of the input tube due to strong broadcast stations.

5. Radiation of local oscillator energy by the antenna. Such radiation must be suppressed to prevent interference with neighboring television receivers.

The methods which have been employed in commercial receivers to fulfill these requirements will be covered by a discussion of individual mechanical and electrical designs, representative of the systems which have appeared to date.

Television RF input systems can be classified in several different ways, according to the mechanical means of channel selection, or the type of electrical circuit employed. From the standpoint of mechanical arrangements, tuning systems may be grouped as, (a) continuous tuning systems (see Figures 167 and 169), and (b) step tuning systems: rotary switch selection, push button switch selection, and mechanical detent, or turret construction. (See Figures 171, 173, 176, 178 and 180.)

From the standpoint of listing according to electrical circuit, input systems may be broadly classified as balanced to ground (see Figures 172 and 181), or unbalanced (with single ended circuits), (see Figures 168, 170, 174, 175, 177, and 179). Another method of grouping, from the standpoint of circuit design, is possible.

1. Lumped equivalent of quarter-wave transmission line. (Figure 172.)

2. Circuits with a variable inductance as the tuning or "trimming" element. (Figures 168, 170, 172, 174, 175, and 177.)

3. Circuits with variable capacitance as the tuning or "trimming" element. (Figures 179 and 181.)

As we analyze the various television input systems in the light of past experience with standard and short wave broadcast receivers, we find a decided difference in tube types employed. All of the tuning systems illustrated in this section use the post war button base miniature construction. This has not been done primarily for the conservation of space, but rather is due to the fact that these small tubes are much more efficient in the V. H. F. region than their larger metal or "octal" counterparts. Another observation which can be made with respect to the choice of tubes, is the frequent use of three-element types, or triodes, especially in the RF stage. This choice of triodes is of interest since it serves to emphasize phenomena peculiar to operation in the V. H. F. region, coupled with the necessity for broad band (six megacycles wide) response.

At the lower frequencies, and with the modulation envelope extending not more than 10kc either side of the carrier frequency, highly selective circuits of high "Q" are universally employed. The necessity for wide-band response, in the television band, requires the use of low "Q" circuits, or circuits deliberately reduced in efficiency by means of parallel resistors, in order to "broaden" the response. These circuits are, by virtue of their loading, of low impedance (between 1000 and 10,000 ohms).

A pentode is useful as an RF amplifier, in the lower frequency bands, by virtue of the fact that its plate resistance is extremely high and thus high-"Q", high-impedance plate load

circuits can be used. In the television band the necessity for wide band response precludes the use of high impedance circuits and, for this reason, a pentode stage will not develop much more voltage gain than a triode. The triode, on the other hand, exhibits several advantages, namely:

1. Appreciably lower tube noise level. This is of extreme importance in the RF stage, where the noise energy, due to electrons in the tube and those circulating in the antenna circuit, may be comparable to the energy of the television signal itself.

2. The inter-electrode capacitances of triodes are lower than comparable pentodes.

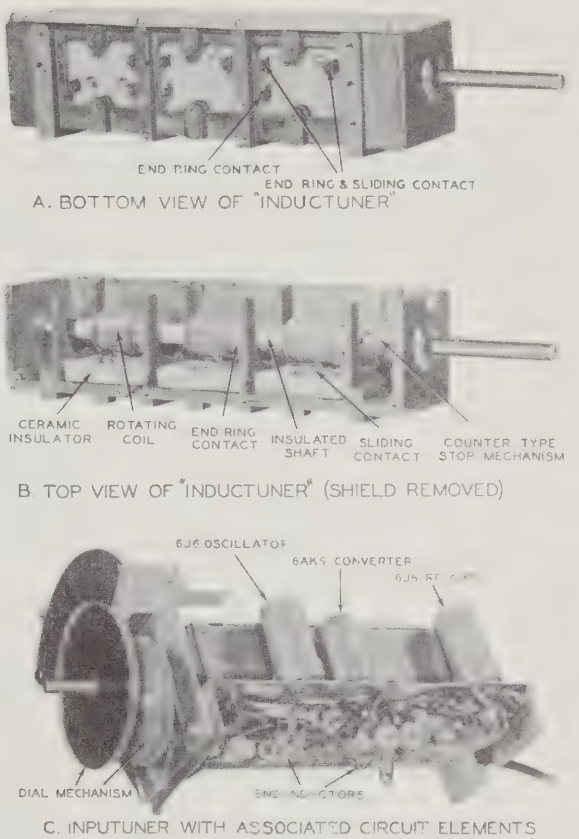
3. Triodes are adaptable to grounded grid circuits and provide better stability than pentodes at V. H. F.

We have indicated that a number of methods of classification of input systems are possible. From the standpoint of interest to the radio service technician we have chosen to present our study on the basis of a grouping by the means of tuning or adjustment employed, i. e.: inductively tuned systems, and capacitively tuned systems.

INDUCTIVELY TUNED INPUT SYSTEMS: Two general types of continuously variable inductively tuned systems have appeared: The continuously sliding contactor type (Mallory-Ware "Inductuner"), and the sliding powdered iron core type (exemplified by the Belmont multiple core tuner). (See Figures 167, 168, 169 and 170.) Semi-fixed adjustable cores with a rotary switch for channel selection, are used in a number of arrangements. (Figures 171, 173 and 175.)

CONTINUOUSLY VARIABLE INDUCTIVELY TUNED INPUT SYSTEMS. Television channel tuning by variable inductance has been accomplished by two distinct methods, namely: inductance variation by sliding electrical contactor and by sliding iron cores.

Tuning by Continuously Variable Contactor Type Inductor. Figures 167A and B illustrate a tuner which is unique in that the inductance of the circuit is made continuously variable. Such a method of tuning is particularly adapted to the V. H. F. range because it makes possible a high ratio of inductance to capacitance and consequently higher circuit



A. BOTTOM VIEW OF "INDUCTUNER"

B. TOP VIEW OF "INDUCTUNER" (SHIELD REMOVED)

C. INPUTUNER WITH ASSOCIATED CIRCUIT ELEMENTS

Fig. 167. (A) and (B) A Continuously Variable Inductance Tuner for Television Reception. Photo from Sample Courtesy P. R. Mallory & Co., Inc. (C) Input Tuning System ("Inputuner") employing the "Inductuner". Photo from Sample Courtesy Allen B. Du Mont Laboratory, Inc.

impedance at the high frequency end of the range. In this tuner, a sliding contactor made of high silver content alloy, possessing spring properties, rides in "trolley fashion" on an inductor made of "fine" silver wire. End rings on the inductor permit circuit connection to both ends of the inductance. The sliding contactor "shorts" the unused portion of the inductance. The "Inductuner" is a three-gang inductor equivalent to a three-gang condenser, and in the input system shown in Figures 167C and 168, the three units are used as a coupled band pass selector stage and a local oscillator. Coupling elements C5, C7 and the shunt circuit L6-C6, are so proportioned that the acceptance band remains constant at six megacycles width over the entire tuning range of the system. The tuning range extends continuously from 44 to 216 megacycles and includes not only the television channels but also FM stations, two amateur bands, aviation channels, V. H. F. radio telephone and commercial services. A

"Inductuner" - Reg. Trade Mark P. R. Mallory & Co., Inc.
"Inputuner" - Reg. Trade Mark Allen B. Dumont Lab. Inc.

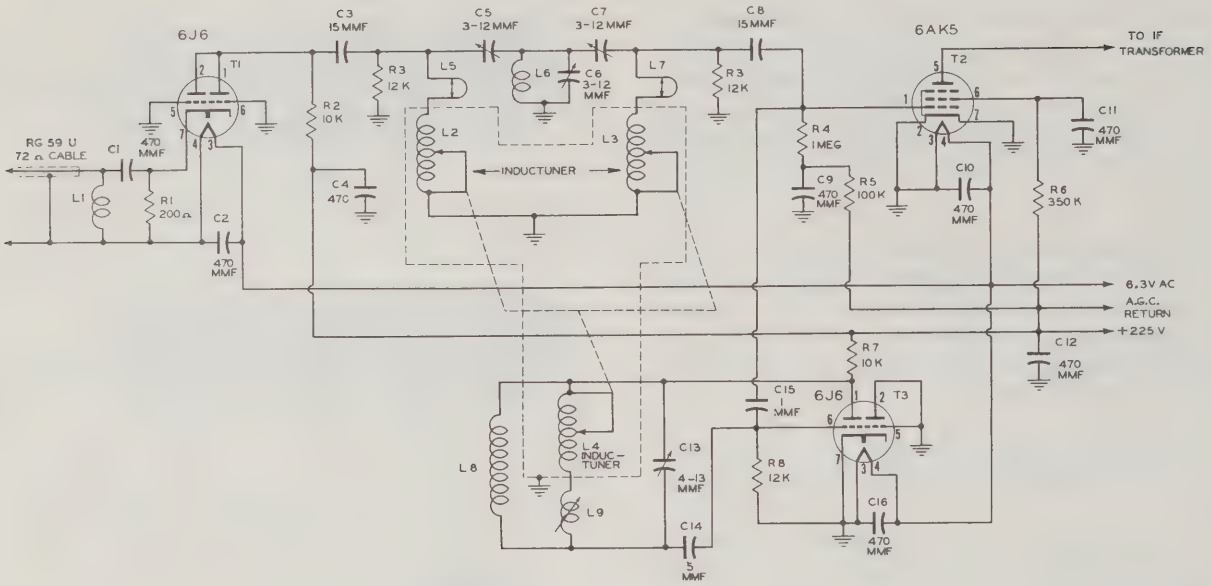


Fig. 168. Schematic of Inductively Tuned Input System Illustrated in Figure 167.

unique dial arrangement shown in Figure 167C makes it possible to use the television receiver for the reception of the high band FM as well as the assigned television channels.

Adjustable end inductors L5, L7 and L9 of Figure 168 perform the same function circuit-wise as the high frequency trimmers of the variable gang condenser. The oscillator circuit shunt inductor (L8) is equivalent to the series "padder" of the conventional superheterodyne oscillator circuit. Since inductors L5 and L7, by structure, possess a higher "Q" than the "Inductuner" itself, performance of the system is improved as the high frequency end is approached. A continuously variable, capacitively tuned system, on the other hand, would suffer in "Q" at the high frequency end of the tuning range.

The circuit of Figure 168 introduces to the television service technician a method of vacuum tube operation, which was introduced during the second World War, known as "grounded grid". Tube T1 is connected so that the signal voltage is introduced between cathode and grid, with the grid connected to ground. Such a connection is of advantage for two reasons: the grid acts as a shield between the input and the output of the tube, to suppress feed-back, or a tendency toward oscillation; injection of the input voltage in the cathode circuit allows a broad band "match" to low impedance parallel lead or coaxial transmission lines. Inductor L1 performs a dual function. It acts as a low pass filter to short-circuit voltages which might be caused by nearby broadcast stations in the 550kc to 1600kc band, and it is broadly resonant to the television band since it is tuned by the cathode-to-ground capacitance of the tube and the associated circuit wiring. This tuning prevents the cathode-to-ground capacitance from decreasing the input impedance of the circuit.

The television service technician will recognize other features of the schematic diagram of Figure 168 as similar to the input systems of lower frequency entertainment receivers. The injection of local oscillator voltage by capacitance coupling between the oscillator and the control grid of the converter tube is a conventional method in the V. H. F. television region.

Continuously Variable Tuning by Powdered Iron Cores. Figure 169 shows a tuning system in which a special type of high frequency powdered iron core is used to change the value of the tuned circuit inductances. This permits selection of television channels on both the low and high frequency bands. In this case, a separate set of inductors and sliding cores are used for each band and electrical switching accomplishes transfer from one band to the other. Figure 170 shows the electrical circuit employed for this input system. Since tuning is continuous, both in this circuit and that of Figure 167, it is not necessary to provide separate fine tuning control. The tuning adjust-

"Inductuner" - Reg. Trade Mark P. R. Mallory & Co., Inc.

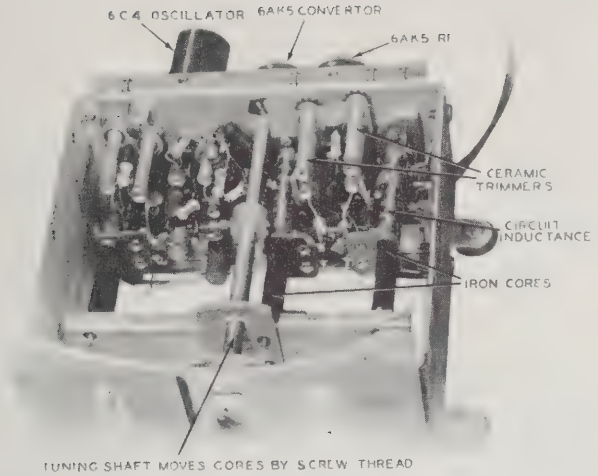


Fig. 169. A Variable Inductance Tuner Employing Movable Powdered Iron Cores. Photo from Television Receiver Courtesy Belmont Radio Corp.

ment is set for optimum performance of the sound channel and this automatically assures a proper setting for the video or picture carrier.

The antenna primary coils, L1 and L3, are balanced to ground, with a center tap connected to the chassis-ground. This permits the use of balanced, parallel-lead transmission line with single ended tube circuits. Both the RF and converter stages employ the miniature type 6AK5 in pentode connection. Broad band response is obtained by loading the tuned circuits with parallel resistors of low value. In the high frequency band the use of parallel resistors is not required, due to higher circuit losses.

Artificial Line Type of Input Tuner. Figure 171 shows a type of input system which has been employed in many receiver designs. The 6J6 twin triode is used and push-pull operation is employed in each stage. The artificial equivalent of a quarter-wave transmission line, made up of a series of inductors with their associated distributed capacitances, is employed in the RF, converter, and oscillator circuits to perform the functions usually associated with "lumped" tuned circuits. These lines are balanced with respect to the chassis or ground. Tuning of the various television channels is accomplished by switching a "short circuit" progressively along the "line".

An understanding of the operation of this type of "front end" is essential to the television service technician both because of its

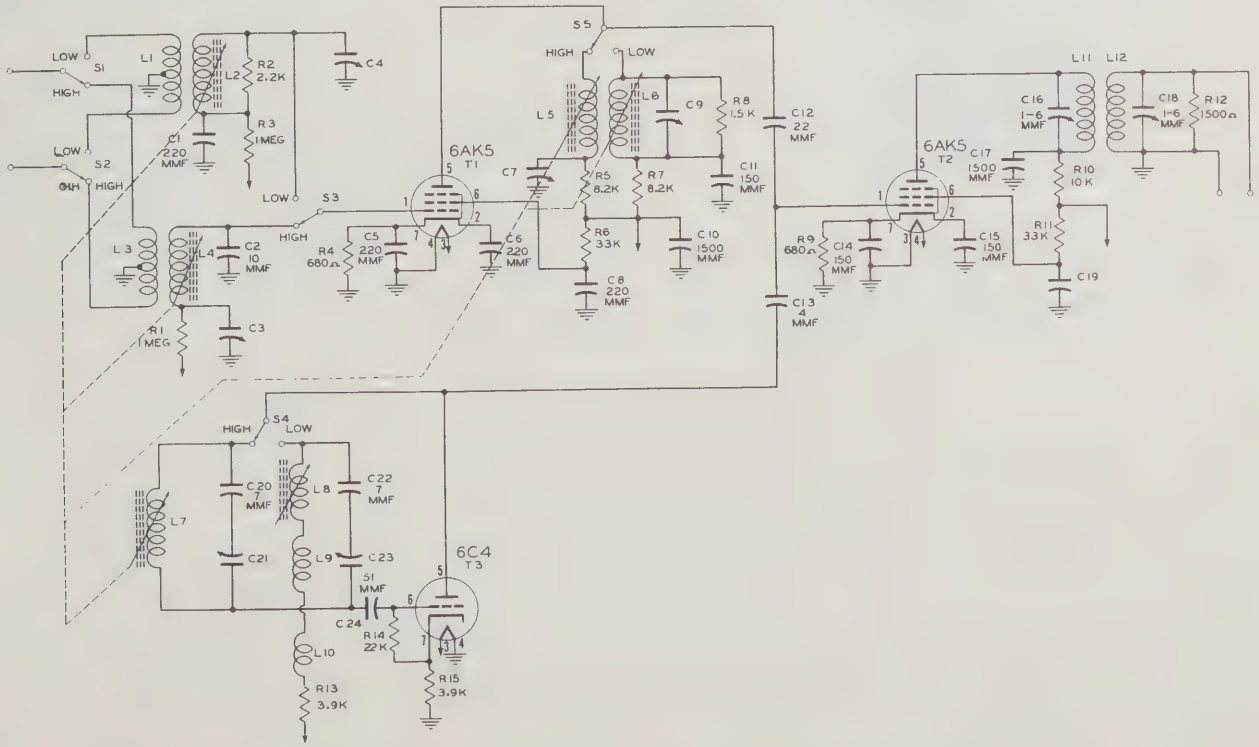


Fig. 170. Schematic of the Iron Core Tuning System Illustrated in Figure 169.

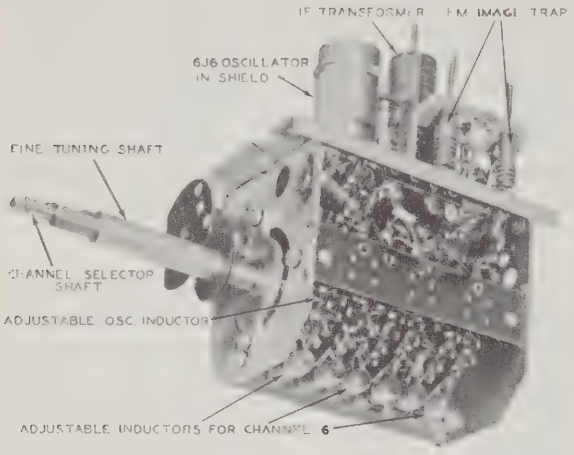


Fig. 171. Input Tuning System Employing "Lumped Equivalent" of Quarter-Wave Transmission Lines. Photo from Sample Courtesy R. C. A.

unusual nature and its frequent use in television receiver design.

The input circuit of tube T1 (see Figure 172), fulfills three distinct functions:

1. Chokes L27 and L28 (center tapped to ground) provide a low frequency bypass for signal frequencies lower than the television band. This prevents cross-modulation effects in the input tube T1. Important sources of such low frequency interference may be:

   a. 60 cycle pickup from power lines near the television antenna.

   b. Local stations, in the broadcast band.

   c. Local high frequency stations such as police, commercial transmitters, etc.

2. Balanced, series-tuned circuits, L29-C9, and L30-C16, can be adjusted to reject "images" due to local FM stations in the 88mc to 108mc band. Such images would fall on several of the television channels (depending on the IF frequency). Adjustment of inductors L29 and L30 permit reduction of such an image to such a point that it will not affect the picture. Another use for these trap circuits is the elimination of the interference between two television stations in certain areas. In this case the image of a station in the low band group, i. e.: channels 2 through 6, may fall on a station in the high band group, channels 7 through 10. The trap circuits may be adjusted to minimize such interference.

3. Resistors R3 and R4 perform the dual functions of matching the 300 ohm transmission

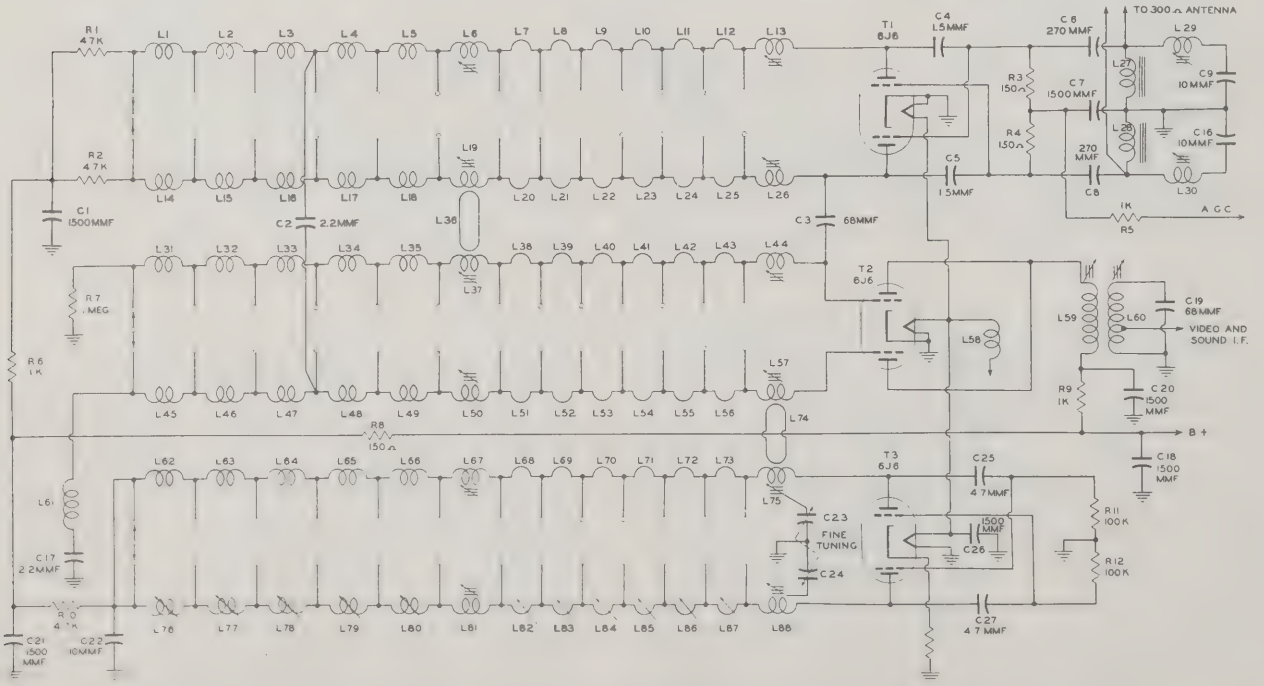


Fig. 172. Schematic Diagram of Tuning System Illustrated in Figure 171.

line to the tube input, and providing a grid return path for automatic gain control, which will be described later.

The RF amplifier tube T1 (6J6) is push-pull connected and "cross neutralized" by means of capacitors C4 and C5. This neutralization increases the stability of the stage by preventing regeneration or oscillation and also reduces the transmission of oscillator energy back through amplifier tube T1 to the antenna.

The plate load of T1 consists of the equivalent of a quarter-wave transmission line, and is made up of inductors L1 through L26. Rotary switch section SW1 "shorts out" sections of the line to tune it to any one of the twelve television channels.

Capacitors C2, C3 and inductive link L36 act as coupling elements between the "line" in the RF plate circuit, and the corresponding "line" comprised of inductors L31 through L57 in the converter grid circuit. The value of these elements is such as to keep the channel width constant over both television bands.

The series-tuned circuit, consisting of L61-C17, is series-resonant at the IF frequency and prevents the direct transmission of interfering signals (short wave broadcast) through the IF amplifier.

The oscillator circuit consists of a transmission line similar to those just described, but with the additional feature that each channel inductance is separately adjustable (see inductors L67, L75 and L76 through L88). The oscillator tube (a push-pull connected 6J6) derives its plate-to-grid feedback, for sustained oscillation, from a crossed pair of capacitors (C25 and C27), whose values are greater than the grid-to-plate capacitance of the 6J6.

Injection of oscillator voltage into the converter grid circuit is accomplished by magnetic coupling between the tuned transmission lines, augmented by the coupling link (L74).

Another input tuning system which employs the quarter-wave resonant line principle is illustrated in Figure 173 and the schematic wiring diagram is shown in Figure 174. In this case, only two lines are employed. Inductors L2 through L25 are used as coupling means between the RF tube, T1, and the converter tube, T2. Inductors L26 through L49 constitute the resonant line for oscillator tuning.

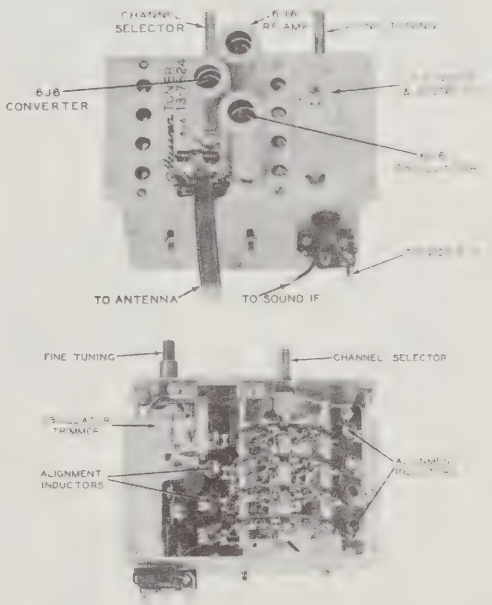


Fig. 173. Another Example of a Quarter-Wave Line Type Input Tuning System. Photo from sample Courtesy Meissner Manufacturing Division, Maguire Industries, Inc.

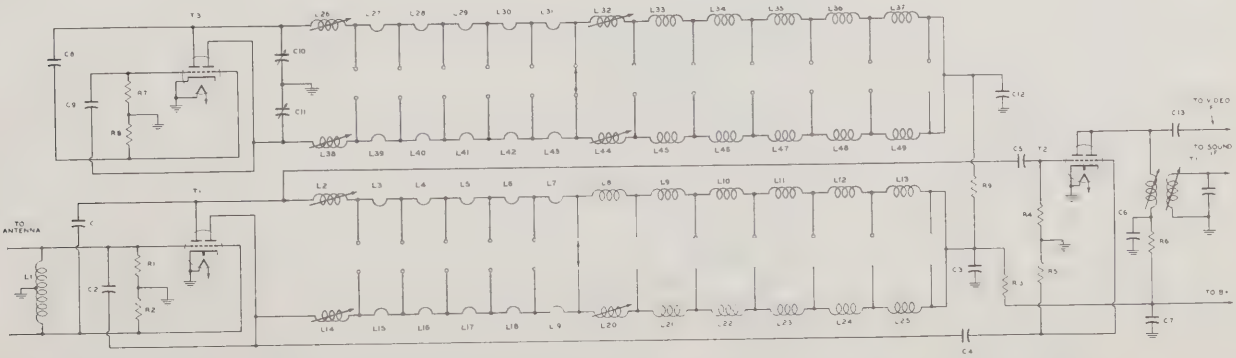


Fig. 174. Schematic Diagram of Tuning System Shown in Figure 173.

The antenna input system is balanced to ground. Inductor L1 serves as a low frequency shunt trap and, in conjunction with the circuit capacitance, is broadly resonant to the television bands.

Adjustment of the resonant-lines is accomplished by variation of the inductors associated with channels 6 and 13. Fine tuning is provided by the dual section vernier capacitor C10 and C11.

Input Systems with Switch-Selected Variable Inductors. Figures 175 and 176 show an input system in which a rotary switch is employed to select the proper inductances for tuning to the desired television channel. Several features not previously discussed are evident in this circuit. The input circuit and method of connection of tube T1 constitutes a means of coupling between a balanced-to-

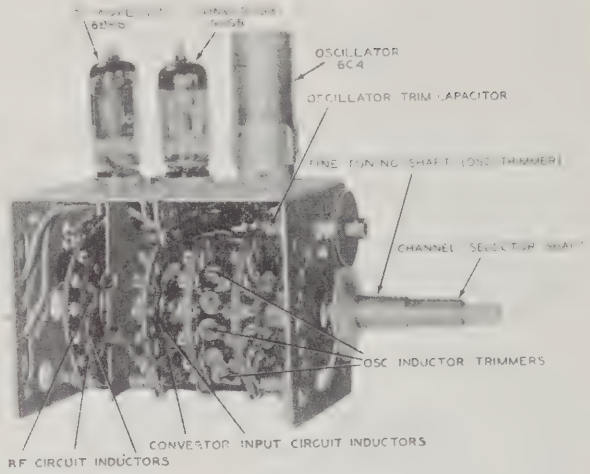


Fig. 175. Input Tuning System Employing Rotary-Switch Selected Inductors. Photo from Sample Courtesy Sarkes Tarzian.

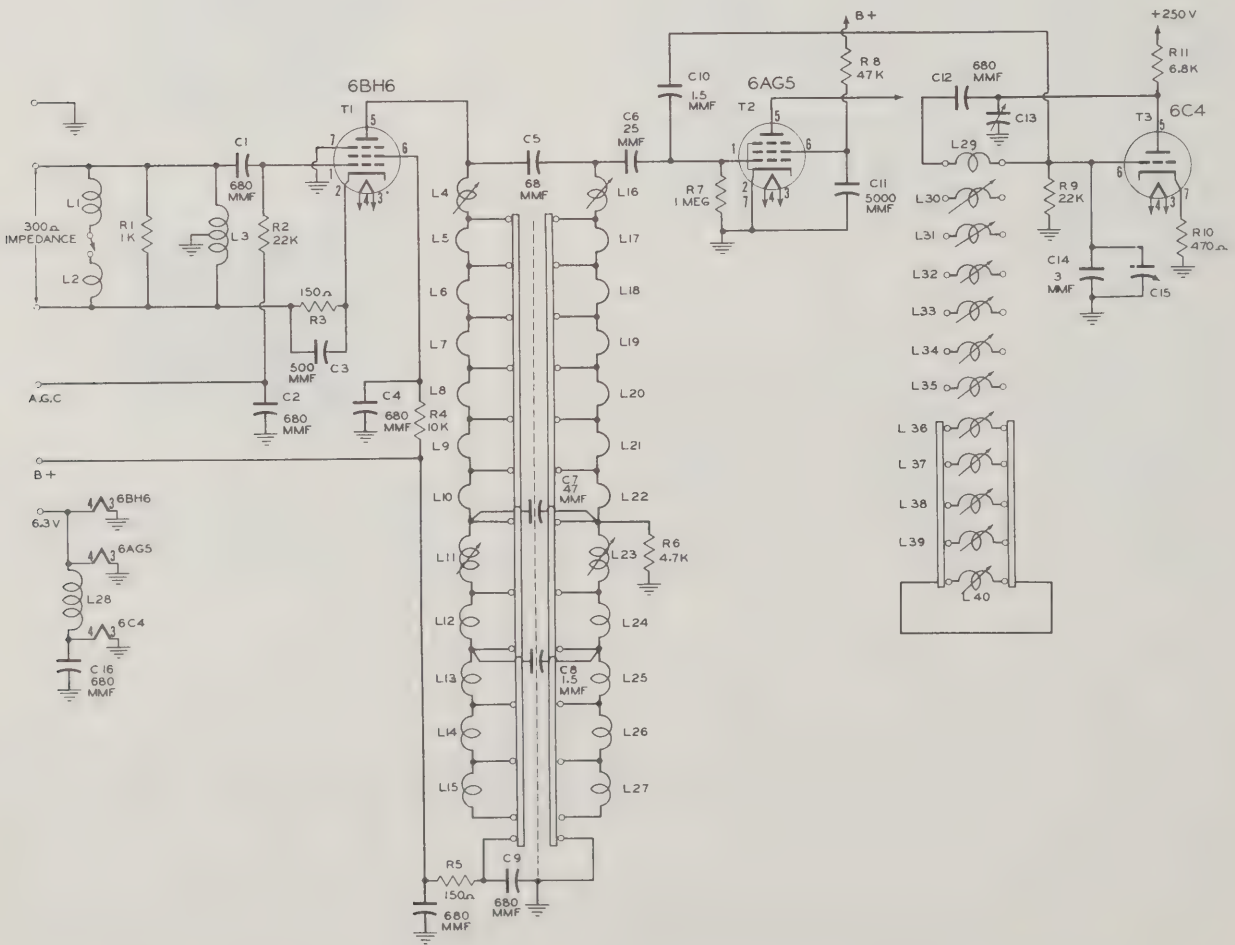


Fig. 176. Schematic Diagram of Input Tuning System Illustrated in Figure 175.

ground transmission line, and a single ended tube circuit. In this case both the grid and the cathode act as input elements and are connected to opposite ends of the center-tapped inductor L3. On the high frequency band (channels 7 through 13) inductors L1 and L2, in series, are connected across L3 to resonate broadly at the higher frequencies.

The inter-stage coupling system consists of two tuned circuits with coupling adjusted to obtain proper band width for all channels. The plate and grid circuit inductances (L4 through L15 and L16 through L27) are selected by the rotary switch. The tuning capacitances of these circuits are made up of the inherent capacitance of the tubes and the capacity of the wiring to ground. Both the circuit shunt loading (R6) and the coupling (C5, C7, C8, and C9) are switch-controlled to help provide uniform (6mc) band width for all channels.

The oscillator circuit switching involves the selection of individually adjusted inductors (L30 through L40). Oscillator tuning capacitor (C13) is made variable for fine tuning.

Another circuit employing switch-selected inductors is shown in Figure 177. In this case the first tube is a triode-connected 6AU6 used as a grounded-grid amplifier. Since the input circuit is heavily loaded to provide matching for the 300 ohm transmission line, its resonance curve is very broad. Only 5 coils (L2 through L6) are required to cover both high and low TV bands.

Interstage coupling is provided by means of a series of wide band transformers (L7 through L33), which are individually switch-selected for television channel. The windings are self resonant, being tuned by their own distributed capacitance, together with the tube capacitances. On the first two channels, image rejection trap circuits (L7-C5) and (L10-C6) are pre-tuned to reject FM station images which might occur on these channels.

The oscillator system (a variation of the Colpitts circuit) selects individually adjusted coils (L34 through L46) for each channel. Oscillator trimmer capacitance C12 is used for fine tuning.

Turret Tuners. Figures 178 and 179 show a tuning system in which the input, converter and oscillator tuned circuits are mounted on a rotating turret. Only the circuit elements associated with a single selected television channel are connected in the circuit

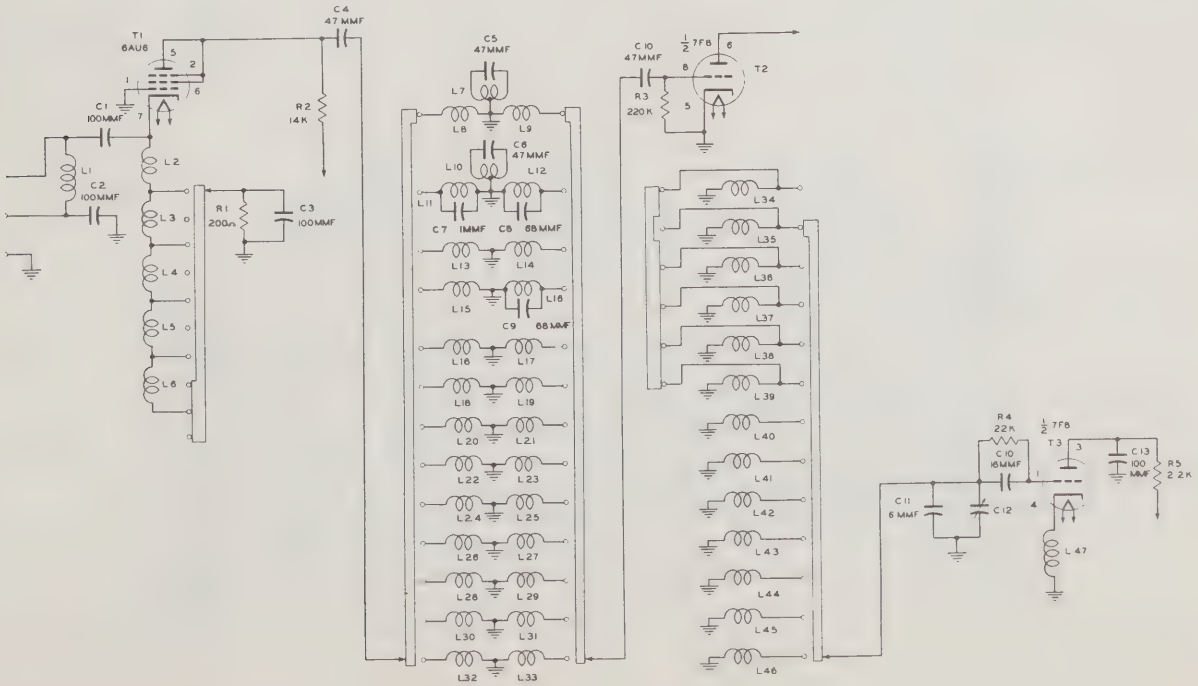


Fig. 177. Schematic of Input Tuning System Employing Switch Selected Inductors. (Broad Tuned, Cathode-Input System.) Courtesy General Electric Co.

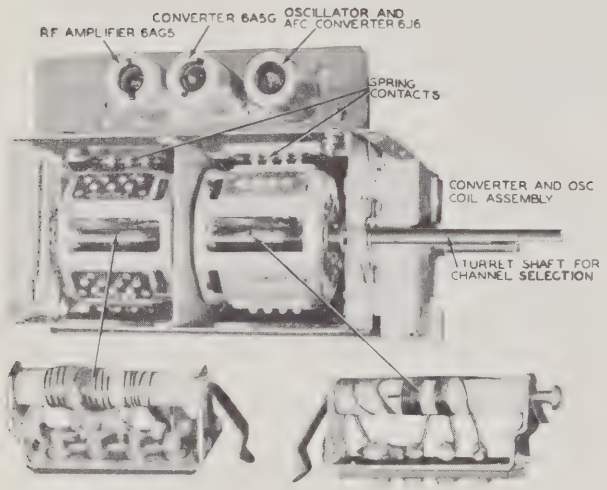


Fig. 178. A Turret Type of Input Tuning System. Photo from Sample Receiver Courtesy Philco Corp.

at any one time. The turret is octagonal in shape and provides tuning for eight channels. The pair of coil assemblies (see Figure 178) for any channel are easily removed, and another pair for a different channel "snapped" in place. Since no more than seven channels are assigned to any given locality, this arrangement should accommodate the allocations of any specific area.

A set of spring backed contacts, associated with the various tube circuits, provide a means of connection to the terminals of the tuned circuits. As the turret is rotated by means of the channel selector knob, studs which terminate each set of coils are positively indexed into contacting position by a wiping action which assures low circuit resistance.

Separate input terminals are provided for the low and high frequency television bands, thus, individual antennas may be employed for high and low band reception. Since the coil design can be altered to accommodate the requirements of each channel, uniform band width is assured. (Figure 179 illustrates

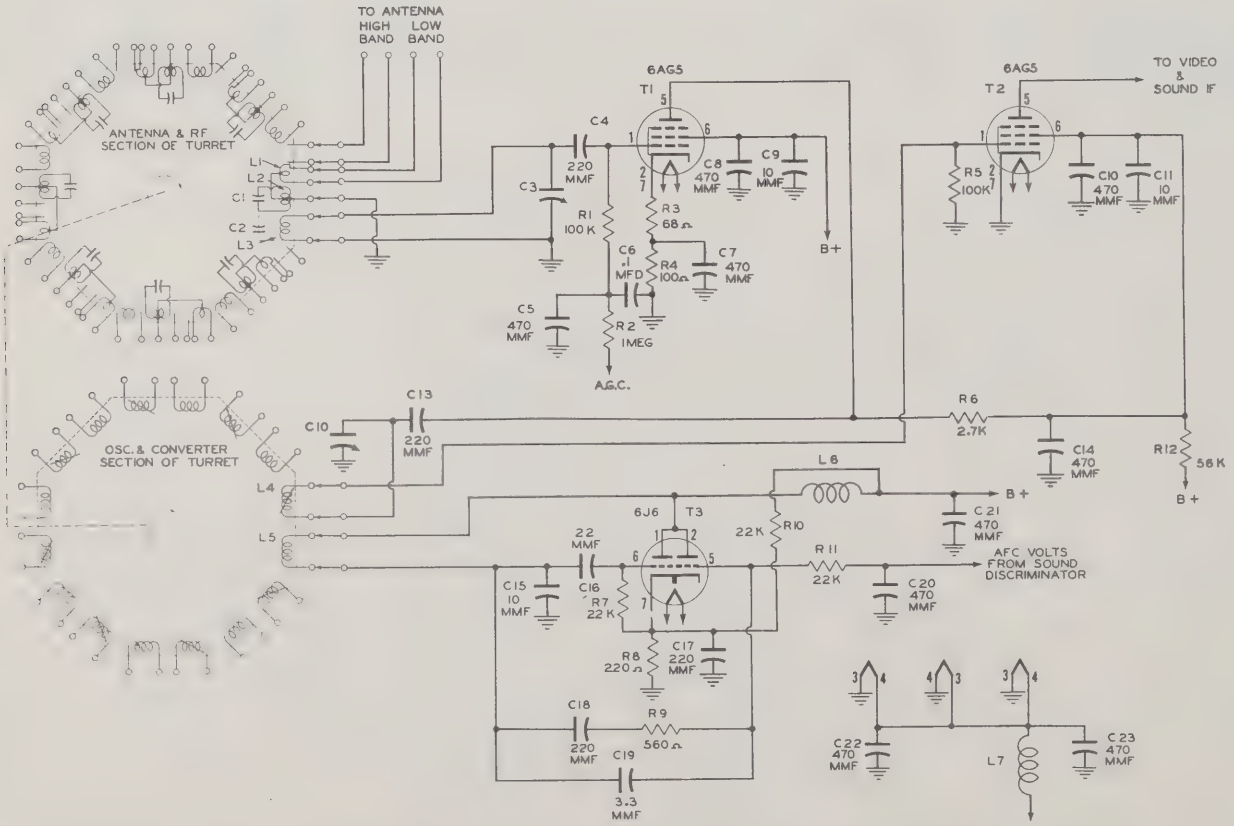


Fig. 179. Schematic of Input Tuning System Illustrated in Figure 178.

variations in wiring of the antenna and RF assemblies for individual channels.)

An unusual feature of this circuit is the omission of the fine tuning control, made possible by automatic frequency control of the local oscillator. The first, or right half, of tube T3 (see Figure 179) functions as an ultra audion (or modified Colpitts) oscillator, while the second, or left half, acts as an automatic frequency control tube to automatically adjust the oscillator to correct frequency. The action of the circuit associated with the second section of T3 is similar to that of the reactance control tube described under AFC horizontal sync control, pages 101 through 105. In this case, the DC control voltage is provided by the FM discriminator, or detector, at the end of the sound channel. The deviation of the oscillator frequency from the center of the correct sound IF frequency will result in the production of a positive or negative voltage on the grid (terminal 5 of tube T3). The plate-to-cathode capacitance of tube T3 (terminals 2 to 7), which is in shunt with the oscillator tuned circuit, can be made to vary in effective value by the change of the DC potential on the grid of the reactance tube, as determined by DC output of the sound channel discriminator.

An RF voltage is fed from the tuned circuit of the oscillator to the grid of the reactance tube through a series network consisting of capacitor C18 and resistor R9. Capacitor C19, which parallels this series network, is employed to neutralize the grid-to-plate capacitance of the reactance tube. Due to the choice of values of capacitor C18 and resistor R9, a phase shift of the oscillator voltage occurs, and causes the reactance tube to draw a plate current that is out of phase with the voltage appearing across the oscillator coil L5. The current drawn by the reactance tube is leading the voltage, and therefore the tube acts as a capacitor whose value at any time is determined by the magnitude of the plate current. In this manner, the grid bias of the reactance tube, which determines the plate current, can vary the effective capacitance of the tube, and thus the frequency of the local oscillator. Since the grid bias at any instant is determined by the frequency of the audio IF carrier, any drift of the oscillator which would produce a change of the IF carrier is automatically compensated. This system, when properly adjusted, reduces the tuning operation to that of merely turning the channel selecting turret to the proper channel.

CAPACITIVELY TUNED INPUT SYSTEMS: Television channel selection by variable capacitance tuning has not appeared as frequently in television designs as have the inductively tuned types previously discussed.

In this type of tuning, it is possible to employ a switch-selected group of circuits which are adjusted by individual trimmers, or to employ a variable capacitor with fixed coils

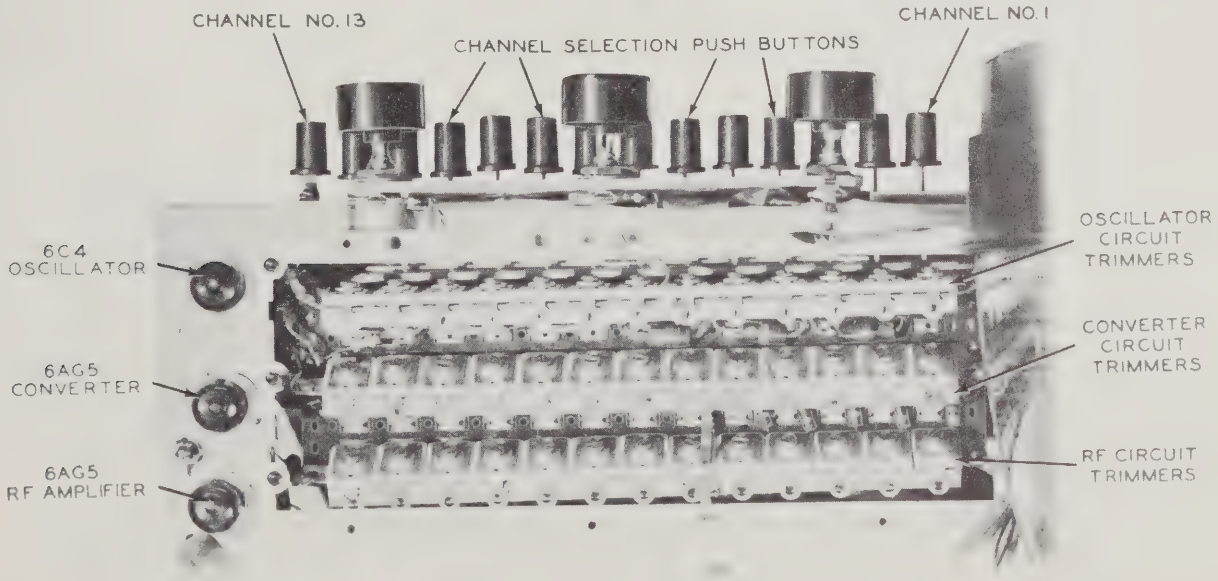


Fig. 180. An Input Tuning System Employing Push Button Selected Trimmer Tuned Circuits. Photo from Sample Courtesy The Hallicrafters Co.

Both methods have appeared commercially in television sets now on the market.

INPUT SYSTEMS WITH SWITCH-SELECTED "TRIMMER" TUNED CIRCUITS. Figures 180 and 181 show a capacitance-tuned input system in which individually adjusted trimming capacitors are connected into the circuit by a push button switch. A separate bank of 13 trimmers (one for each channel) is used for RF amplifier converter and oscillator tuning.

The input circuit, which matches 300 ohm parallel-lead transmission line, is similar to that described in connection with Figure 176. The RF amplifier tube (T1) has an input circuit balanced to ground, with half of the voltage injected from grid-to-ground and the other half from cathode-to-ground.

The coupling network between the plate of the RF tube and the grid of the converter consists of two tuned circuits with "high side" capacitance coupling. The value of the coupling is varied individually for each of the low frequency channels (capacitors C24, C25, C26, C27, C28, and C29). When a channel of the high frequency group (channel 7 through 13) is selected, sufficient coupling is provided by inherent capacitance between the parts of the circuit (switch, wiring and trimmer banks). In this manner the bandwidth is kept sufficiently broad for all channels.

It will be noted from the schematic diagram of Figure 181, that the tuned circuits employ the trimmer capacitor in series with the tuning coil and the capacitance of the tube. This allows the use of a reasonably large trimming capacitance and still makes it possible to maintain a high L to C ratio.

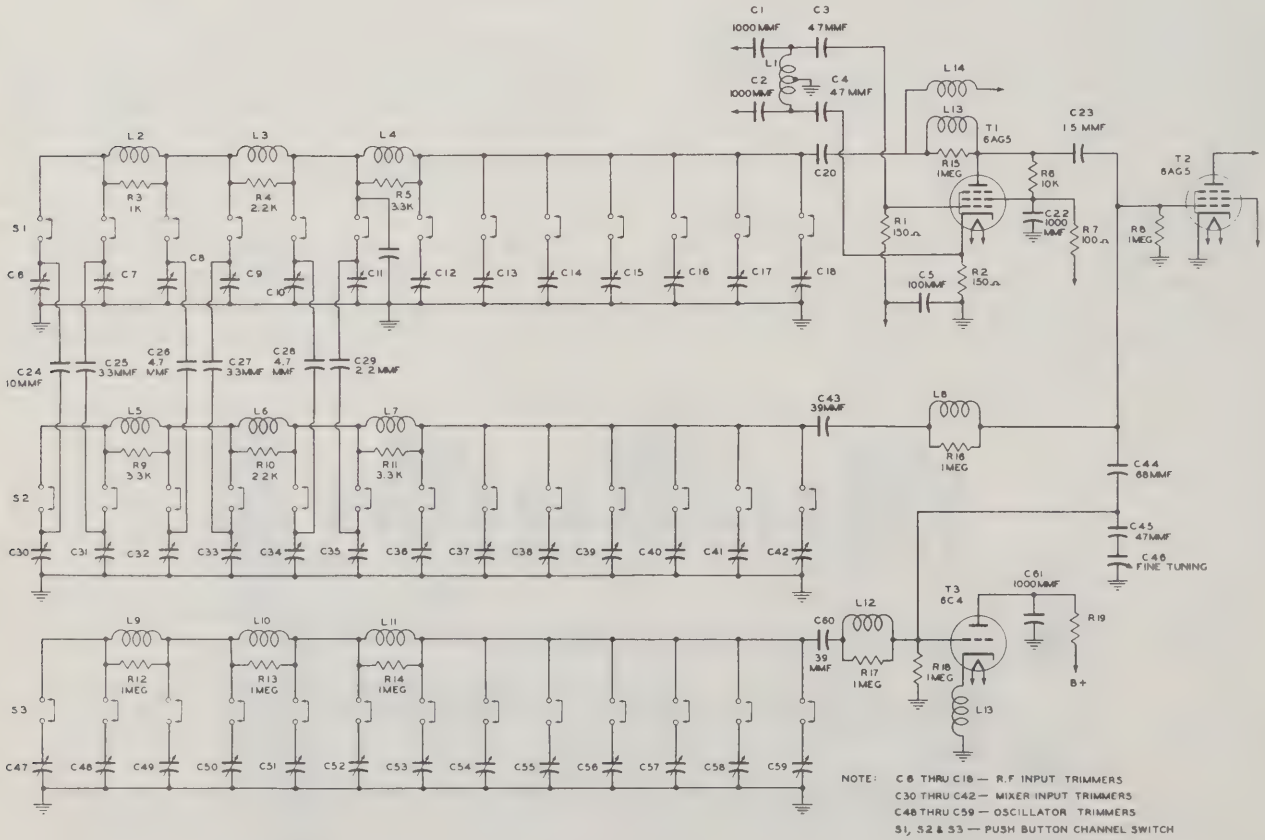


Fig. 181. Schematic of Input Tuning System Shown in Figure 180.

AIRCASTLE MODEL G-725

TRADE NAME	Aircastle, Model G-725
SUPPLIER	Spiegel, Inc., 1061 W. 35th St., Chicago, Ill.
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (SEVEN)	Types, 6SB7Y Converter, 12SG7 1st IF Amp., 12SG7 2nd IF Amp., 7A6 FM Ratio Det., 12SQ7GT AM Det.-AVC-AF, 35L6GT Power Output,
POWER SUPPLY	105-125 Volts AC or 120 Volts DC — RATING .33 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1620KC — FREQ. MOD. 87.6-108.4MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

With receiver out of cabinet turn tuning cap. fully closed and mark position of pointer. From this point on the dial backplate measure off and mark the following distances: 1-5/32", 1-3/4", 5-13/16" and 6-5/8" these are 600KC, 92MC, 106MC and 1550KC reference marks referred to in alignment Steps below.

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.

Use insulated alignment screwdriver for all adjustments.

AM IF ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to rear AM stator of tuning cap. Low side to chassis.	455KC	BC (clockwise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3	Adjust for maximum output If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.

FM ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

If a VTVM is not available a 20KΩ per volt DC voltmeter may be used as an output indicator.

In Step 3 connect 2 100KΩ resistors in series from Point (A) to chassis. The values of these two resistors must be within 1% of each other. The junction of these 2 resistors is Point B. (See schematic)

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
2	.01 MFD	High side to Pin 4 (grid) 12SG7 2nd IF Tube (3). Low side to chassis.	10.7MC (unmodulated)	FM (counter clockwise)	Tuning cap. fully open.	DC probe to Point (A) Common to chassis	A4	Adjust for maximum deflection.
3	.01 MFD	"	"	"	"	DC probe to Point (C) Common to B. (See prealignment notes)	A5	Adjust for zero deflection
4	.01 MFD	"	10.4MC	"	"	DC probe to Point (A) Common to chassis	A6	Adjust for maximum deflection.
5	.01 MFD	"	11.0MC	"	"	"	A7	Adjust for maximum deflection. Repeat Steps 3, 4 and 5 until no further improvement can be made making Step 3 last adjustment. Disconnect 2 100KΩ resistors.
6	.01 MFD	High side to Pin 4 (grid) 12SG7 1st IF Tube (2) Low side to chassis.	10.7MC	"	"	"	A8,A9	Adjust for maximum deflection.
7	.01 MFD	High side to Pin 8 (grid) 6SB7Y. Low side to chassis.	"	"	"	"	A10,A11	"
8	300Ω carbon resistor	High side to terminal D of ant. terminal strip. Low side to chassis.	92MC	"	92MC reference mark.	"	A12	"
9	"	"	106MC	"	106MC reference mark.	"	A13, A14	Adjust for maximum deflection. Repeat Steps 8 & 9 until no further improvement can be made. Continue with AM RF alignment.

FOR AM-RF AND ALTERNATE FM ALIGNMENT SEE PAGE 4

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		AIRCASTLE PART No.	STANDARD REPLACEMENT		
1	Converter	6SB7Y	6SB7Y	8R	
2	1st IF Amp.	12SG7	12SG7	8BK	
3	2nd IF Amp.	12SG7	12SG7	8BK	
4	FM Ratio Det.	7A6	7A6	7AJ	
5	AM Det.-AVC-AF	12SQ7	12SQ7	8A	
6	Power Output	35L6GT	35L6GT	7AC	
7	Power Output	35L6GT	35L6GT	7AC	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	AIRCASTLE PART No.	SOLAR PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	
8A	60	150	CE87	DY-604020-150	EL-340	AF888D	UP44415	Filter-Red & Grn.
B	40	150		M-20-150	UT-201	PRS150-20	BR2015	" -Or.
C	40	150						" -Blue
9	5	50	CE88	M-4-450	TA-55	PRS150-4		Stabilizing Cap.
10	.075	600		MPH-6-1	TC-1	684-.1	DT6P1	Line Filter
11	.01	600		S-6-01	TC-11	684-01	DT6S1	Filament Bypass
12	.25	400		S-4-25	TC-2	484-.25	DT4P25	RF Bypass Power Supply*
13	.01	600		S-6-01	TC-11	684-01	DT6S1	Output Plate Bypass
14	.01	600		S-6-01	TC-11	684-01	DT6S1	Audio Coupling
15	.005	400		S-6-005	TC-25	484-005	DT6D5	" "
16	.01	600		S-6-01	TC-11	684-01	DT6S1	RF Bypass
17	.003	600		S-6-003	TC-23	684-003	DT6D3	Tone Comp.
18	.003	600		S-6-003	TC-23	684-003	DT6D3	Tone Comp.
19	.1	400		S-4-1	TC-1	484-.1	DT4P1	RF Bypass Pwr. Supply
20	.01	600		S-6-01	TC-11	684-01	DT6S1	1st IF Decoupling
21	.05	400		S-4-05	TC-15	484-05	DT4S5	Conv. Decoupling
22	.1	400		S-4-1	TC-1	484-.1	DT4P1	AVC Filter
23	.01	600		S-6-01	TC-11	684-01	DT6S1	Ext. Ground Isolation
24	.25	600						Phono Isolation
25A	.1							Phono Motor Filter
B	.1							" " "
26	100			MO.5-31	1FM-31	1468-0001	5W5T1	Output Grid Bypass
27	22			MO.5-425	1FM-425	1468-000025	5W5Q25	IF Coupling
28	2200							Fixed Trimmer
29	220			MO.5-325	1FM-325	1468-00025	5W5T25	Diode RF Filter
30	470			MO.5-35	1FM-35	1468-0005	5W5T5	Tone Comp.
31	1000			MO.3-21	1FM-21	1468-001	1W5D1	Diode Load Cap.
32	100			MO.5-31	1FM-31	1468-0001	5W5T1	Osc. Grid Cap.
33	220			MO.5-325	1FM-325	1468-00025	5W5T25	Filament Bypass
34	220			MO.5-325	1FM-325	1468-00025	5W5T25	RF Bypass
35	33							Fixed Padder
36	10			MO.5-41	1FM-41	1468-00001	5W5Q1	RF Coupling
37	820							RF Bypass
38	100			MO.5-31	1FM-31	1468-0001	5W5T1	Fixed Trimmer
39	33			MO.5-43	MS-43	1468-00004	5W5Q3	RF Coupling
40	470			MO.5-45	1FM-35	1468-0005	5W5T5	Conv. Screen Bypass

*Not used in all models.

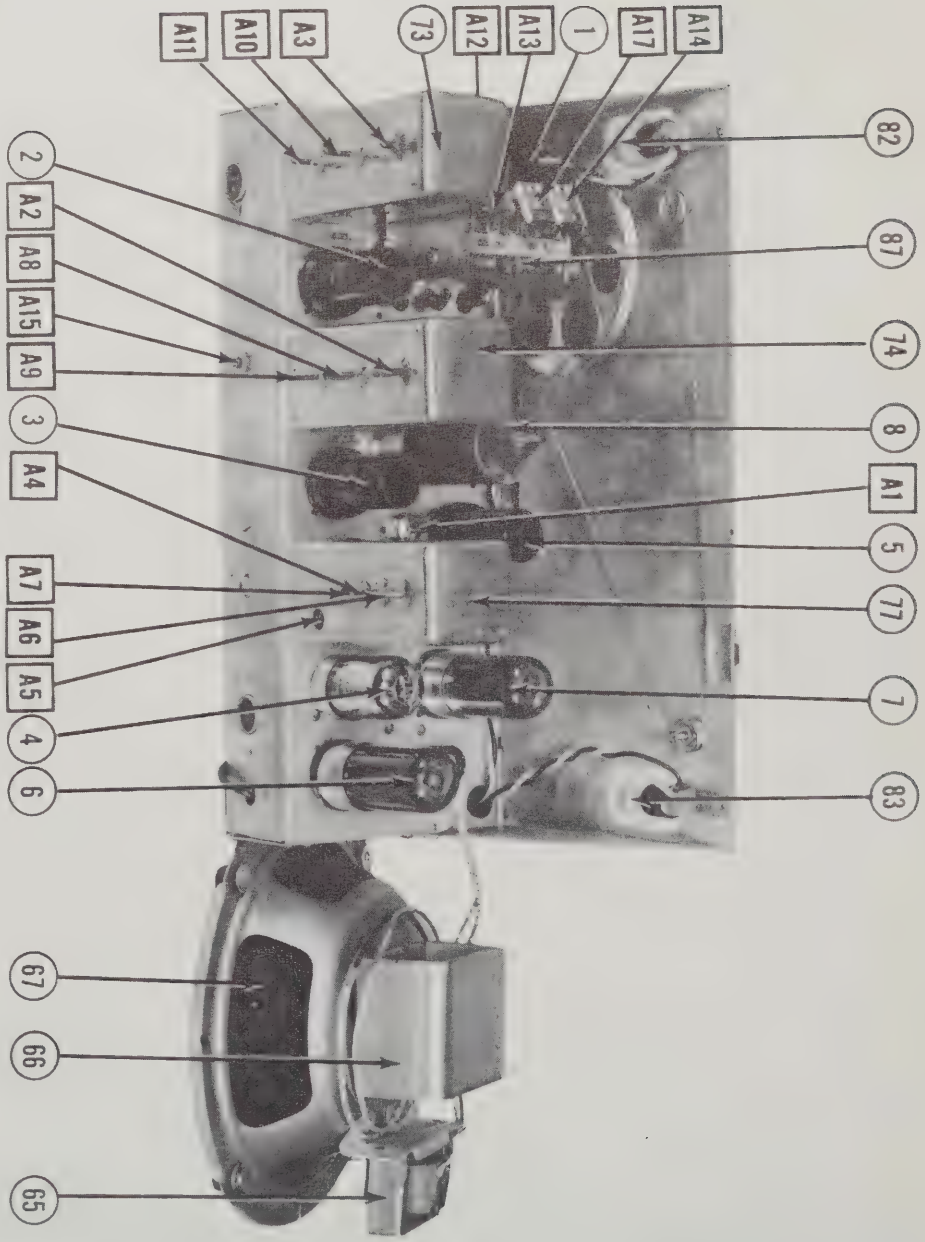
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA				INSTALLATION NOTES
	RESIST-ANCE	WATTS	AIRCASTLE PART No.	MALLORY PART No.	IRC PART No.	CLAROSTAT PART No.	
41	1 Meg.	½	RP11-105A				Volume Control tapped @ 150KΩ & 300KΩ

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	AIRCASTLE PART No.	IRC PART No.	
42	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
43	330Ω	½		BW-½-330	Or.-Or.-Br. Decoupling
44	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
45	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. Diode Load
46	220KΩ	½		BTS-220K	Red-Red-Yl. Diode RF Filter
47	22KΩ	½		BTS-22K	Red-Red-Or. Ratio Detector Diode Load

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA AIRCASTLE PART No.	REPLACEMENT DATA IRC PART No.	IDENTIFICATION CODES
48	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vl.-Grn. AF Grid
49	330KΩ	½		BTS-330K	Or.-Or.-Yl. AF Plate Load
50	330KΩ	½		BTS-330K	Or.-Or.-Yl. Output Grid
51	47Ω	1		BW-1-47	Yl.-Vl.-Blk. Output Cathode
52	47Ω	½		BW-½-47	Yl.-Vl.-Blk. Parasitic Suppressor
53	680KΩ	½		BTS-680K	Blue-Gray-Yl. Phono Shunt
54	470KΩ	½		BTS-470K	Yl.-Vl.-Yl. Series Phono
55	47KΩ	½		BTS-47K	Yl.-Vl.-Or. Tone Compensation
56	22KΩ	½		BTS-22K	Red-Red-Or. Tone Compensation
57	68KΩ	½		BTS-68K	Blue-Gray-Or. Tone Compensation
58	330Ω	½		BW-½-330	Or.-Or.-Br. Filter
59	110Ω	2		BW-2-120	Br.-Br.-Br.
60	12Ω	1		BW-1-12	Br.-Red-Blk. Surge Limiter
61	68Ω	2		BW-2-68	Blue-Gray-Blk. Filament Shunt
62	150Ω	½		BW-½-150	Br.-Grn.-Br. Filament Shunt-See Note
63	68Ω	1		BW-1-68	Blue-Gray-Blk. Filament Shunt-See Note
64	150Ω	½		BW-½-150	Br.-Grn.-Br. 2nd IF Screen Decoupling-See Note

Note-Not used in all models.

TRANSFORMER (OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA AIRCASTLE PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA THORDAR'N PART No.	REPLACEMENT DATA MERIT PART No.	INSTALLATION NOTES
65	12000Ω	4.3Ω	50Ω	.6Ω	Part of EH-18		T22887		

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA AIRCASTLE PART No.	REPLACEMENT DATA JENSEN PART No.	REPLACEMENT DATA QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-117		
66	PM	4.3Ω	EH-18	Mod. P8-T		
	CONE DIA.	VC DIA.				
67	7½"	1"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

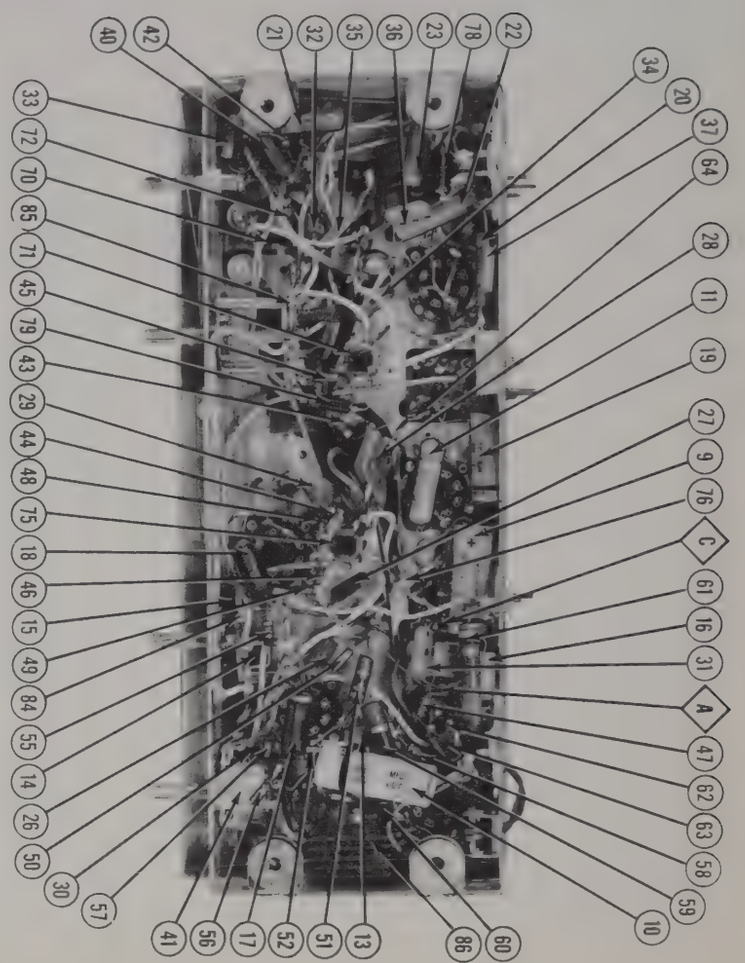
R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA AIRCASTLE PART No.	REPLACEMENT DATA MEISSNER PART No.	
68	FM Ant.					
69	BC Ant. Coil	19Ω	2.2Ω	LR24		
70	FM " "		0Ω	LR17		
71	AM Osc. "	.5Ω	4.3Ω	LO14		
72	FM Osc. "		0Ω	LO13		
73A	Input IF AM	.1Ω	INF.	TM6		
B	" " FM	.8Ω				
74A	Output IF AM	.8Ω†		TM15		†Includes both primaries
B	Output IF FM					
75	IF Coil		.8Ω	TM14		
76	FM IF Plate Choke		2.1Ω	LF9		
77	Ratio Det.		.2Ω	TM5		
78	Wave Trap		0Ω	LF8		
79	" "		0Ω	LF8		
80	RF Choke		0Ω			
81	RF Choke		0Ω			

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA AIRCASTLE PART No.	REPLACEMENT DATA	INSTALLATION NOTES
82	Screw	120V					Type C-7
83	"	120V					"

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	AIRCASTLE PART No.	NOTES
84	Switch	SR27	Tone
85	"	SR30	Band
86	Rectifier	ED2	Selenium
87	Tuning Gang	CV15-2	AM (30-427MMF, 30-427MMF)
	Dial Scale	ND31	
	Dial Pointer	NP7-2	

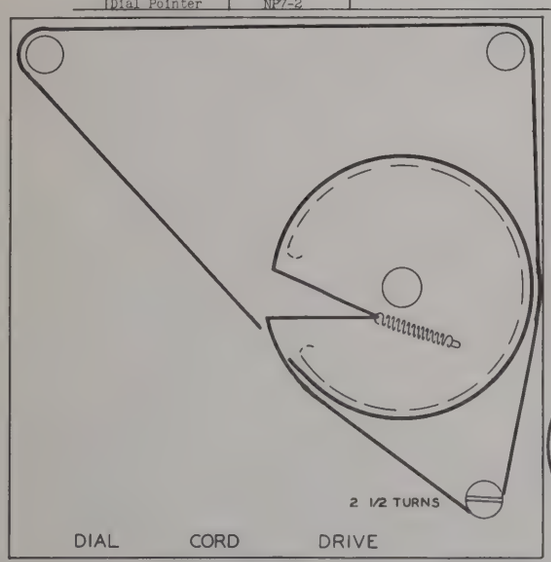


FIG. 1

FIG. 2

FOR AM-IF AND ALTERNATE FM ALIGNMENT SEE PAGE 1.

FM ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal 450KC sweep with 60∿ modulation except in Step 3 where 225KC sweep is used. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
2	.01 MFD	High side to Pin 4 (grid) 12SG7 1st IF Tube (2). Low side to chassis.	10.7MC (freq. modulated	FM (counter clock-wise)	Tuning cap. fully open.	Vertical input to Point ⚠ Ground to chassis.	A4,A8, A9	Disconnect 5 MFD cap. from Point ⚠ Adjust A4, A8, A9 for maximum amplitude, symmetry and coincidence of pattern per Figure 1.
3	.01 MFD	High side to Pin 8 (grid) 6SB7Y. Low side to chassis.	"	"	"	"	A10,A11	Adjust for maximum amplitude, symmetry & coincidence of pattern per Figure 1.
4	.01 MFD	High side to Pin 4 (grid) 12SG7 1st IF Tube (2). Low side to chassis.	10.7MC (freq. modulated 225KC sweep)	"	"	Vertical input to Point ⚠ Ground to chassis.	A5,A6, A7	Reconnect 5 MFD cap. to Point ⚠ Alternately adjust A6 & A7 for peaks occurring about 200KC from center of pattern and A5 for maximum straightness of crossover lines with crossover occuring at center of pattern per Fig. 2.
5	300Ω carbon res.	High side to terminal D of ant. terminal strip. Low side to chassis.	92MC	"	92MC reference mark	Vertical input to Point ⚠ Ground to chassis.	A12	Disconnect 5 MFD cap. from Point ⚠ Adjust A12 for coincidence of pattern per Fig. 1.
6	"	"	106MC	"	106MC reference mark.	"	A13, A14	Adjust A13 for coincidence, adjust A14 for maximum amplitude of pattern per Fig. 1. Repeat Steps 5 & 6 until no further improvement can be made. Reconnect 5 MFD cap. to Point ⚠ and continue with Am RF Alignment.

AM RF ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
10	100MMFD	High side to terminal A on ext. ant. terminal strip. Low side to chassis.	600KC	BC	600KC reference mark	Across voice coil	A15	Adjust for maximum output
11	100MMFD	"	1550KC	"	1550KC reference mark	"	A16	Adjust for maximum output Repeat Steps 10 & 11 until no further improvement can be made.

DATE 11/49-#4820-1 SET #50-FOLDER #1

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.
‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SB7Y	0V.	0V.	92VDC	92VDC	-15.7VDC§	0V.	5.4VAC	-.4VDC
2	12SG7	0V.	32VAC	0V.	-.5VDC	0V.	86VDC	45VAC	86VDC
‡ 3	12SG7	0V.	17VAC	0V.	-.7VDC	0V.	92VDC	32VAC	95VDC
‡ 4	7A6	14VAC	0V.	-.05VDC	0V.	0V.	0V.	-.05VDC	17VAC
5	12SQ7	0V.	-1.6VDC	0V.	0V.	-1VDC	55VDC	14VAC	0V.
6	35L6GT	6VDC	112VAC	100VDC	95VDC	0V.	0V.	80VAC	6VDC
7	35L6GT	6VDC	80VAC	100VDC	95VDC	0V.	0V.	45VAC	6VDC

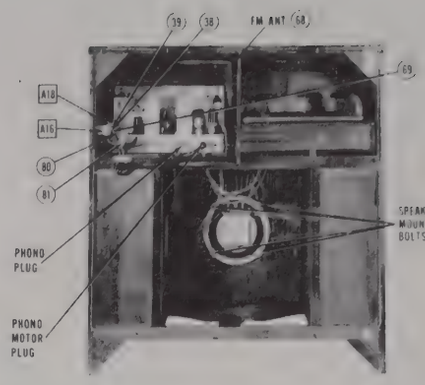
§TAKEN WITH VACUUM TUBE VOLTMETER.

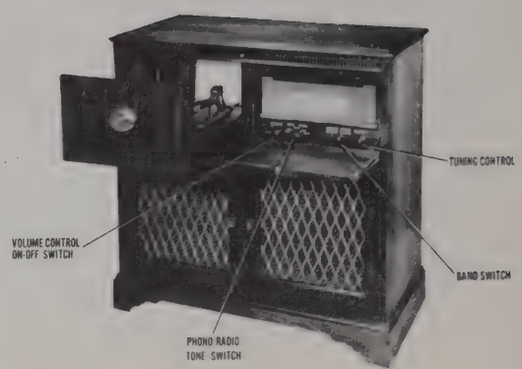
RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SB7Y	0Ω	0Ω	100KΩ	100KΩ	22KΩ	.4Ω	5Ω	1.5 Meg
2	12SG7	0Ω	28.5Ω	0Ω	2 Meg.	0Ω	100KΩ	40Ω	100KΩ
‡ 3	12SG7	0Ω	18Ω	0Ω	320KΩ	0Ω	100KΩ	28.5Ω	100KΩ
‡ 4	7A6	12Ω	0Ω	800KΩ	INF.	0Ω	22KΩ	800KΩ	18Ω
5	12SQ7	0Ω	5 Meg.	0Ω	0Ω	2.5 Meg.	400KΩ	12Ω	0Ω
6	35L6	44Ω	90Ω	100KΩ	100KΩ	300KΩ	300KΩ	65Ω	44Ω
7	35L6GT	44Ω	85Ω	100KΩ	100KΩ	300KΩ	300KΩ	40Ω	44Ω

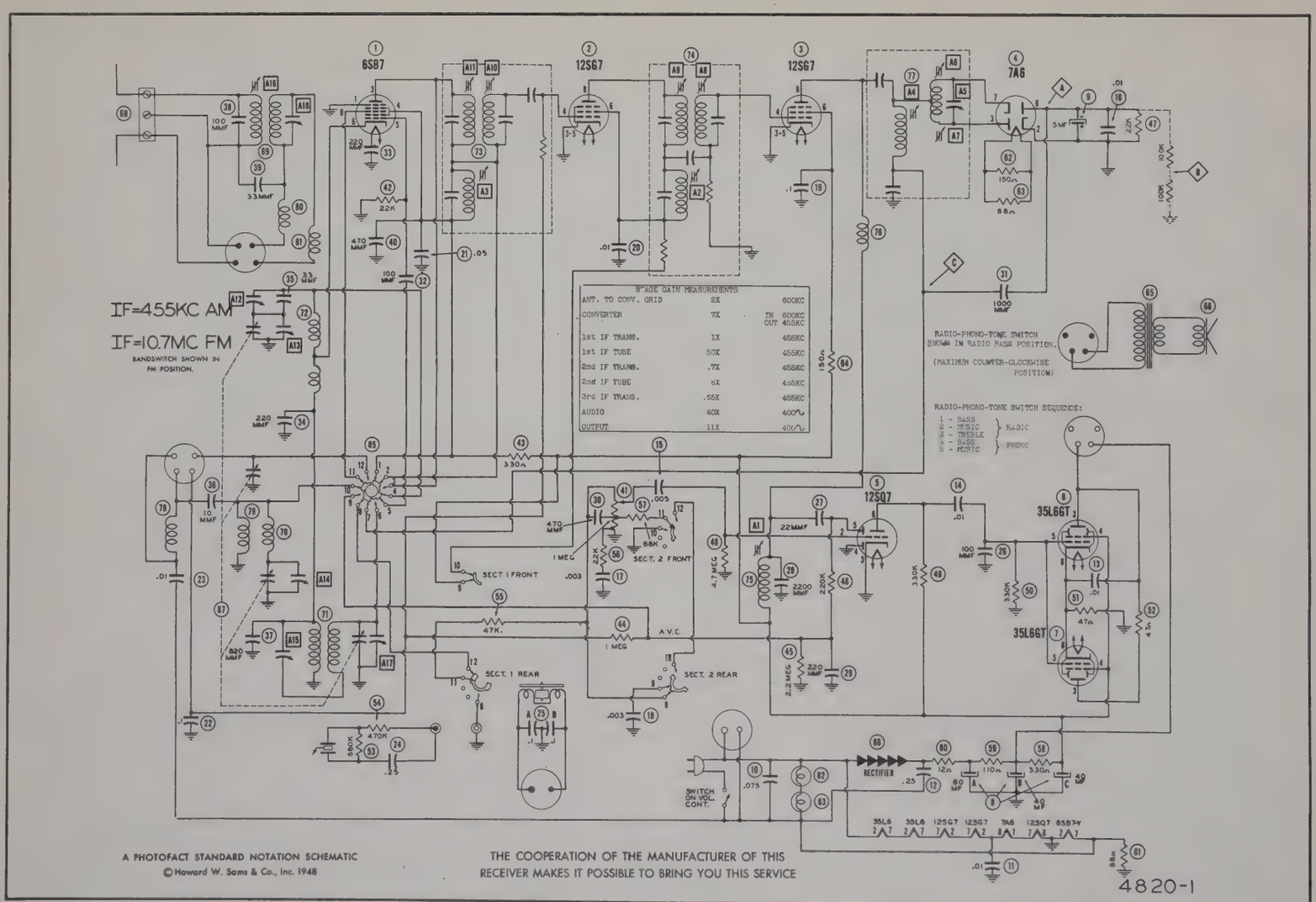
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.





DATE 11/46-4820-1 SET #50-FOLDER #1



A PHOTOFACT STANDARD NOTATION SCHEMATIC
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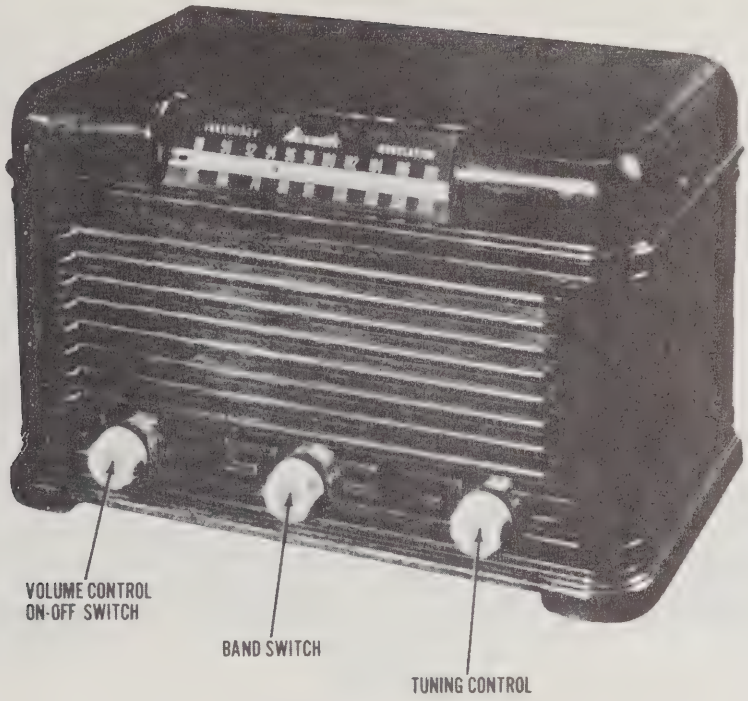
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

4820-1

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



AIRCASTLE MODEL 9

TRADE NAME	Aircastle, Model 9
SUPPLIER	Spiegel, Inc.. 1061 W. 35th St.. Chicago, Ill.
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 14F8 FM Det., 12BE6 Converter, 12BA6 IF Amp., 12AT6 Det.-AVC-AF, 35B5 Power Output, 35W4 Rectifier.
POWER SUPPLY	105-125 Volts AC — RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1700KC — FREQ. MOD. 88 - 108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set dial pointer turn tuning cap. fully closed and set pointer 1-11/16" from left edge of dial backplate. This is the calibration mark referred to in Steps below.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to Pin 7 (grid) of 12BE6. Low side to B-.	455KC	AM (Counter-clock-wise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy antenna to .001 MFD. to reduce hum modulation.
2	200 MMFD	High side to ext. ant. lead. Low side to B-.	1500KC	"	4-1/16" from calibration mark.	"	A5	Adjust for maximum output
3	200 MMFD	"	"	"	Tune for max-imum output.	"	A6	" " " "
4	Direct	High side to FM ant. terminal. Low side to chassis.	21.75MC (400~ AM)	FM (Clock-wise)	Tuning cap. fully open.	"	A7	" " " "
5	"	"	88MC	"	1/4" from calibration mark.	"	FM Osc Coil (68)	Spread or compress FM Osc. Coil slightly for maximum output.
6	"	"	108MC	"	4-9/16" from calibration mark.	"	A8	Adjust for maximum output Repeat Steps 5 & 6 until no further improvement can be made.
7	"	"	90MC	"	Tune for max-imum output.	"	FM Ant. Coil (66)	Rock tuning cap. and ex-pand or compress FM ant. coil slightly for maxi-mum output.
8	"	"	108MC	"	"	"	A9	Adjust for maximum out-put. Repeat Steps 7 & 8 until no further improve-ment can be made.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		AIRCASTLE PART No.	STANDARD REPLACEMENT		
1	FM Det.	14F8	14F8	8BW	
2	Converter	12BE6	12BE6	7CH	
3	IF Amp.	12BA6	12BA6	7BK	
4	Det.-AVC-AF	12AT6	12AT6	7BT	
5	Power Output	35B5	35B5	7BZ	
6	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

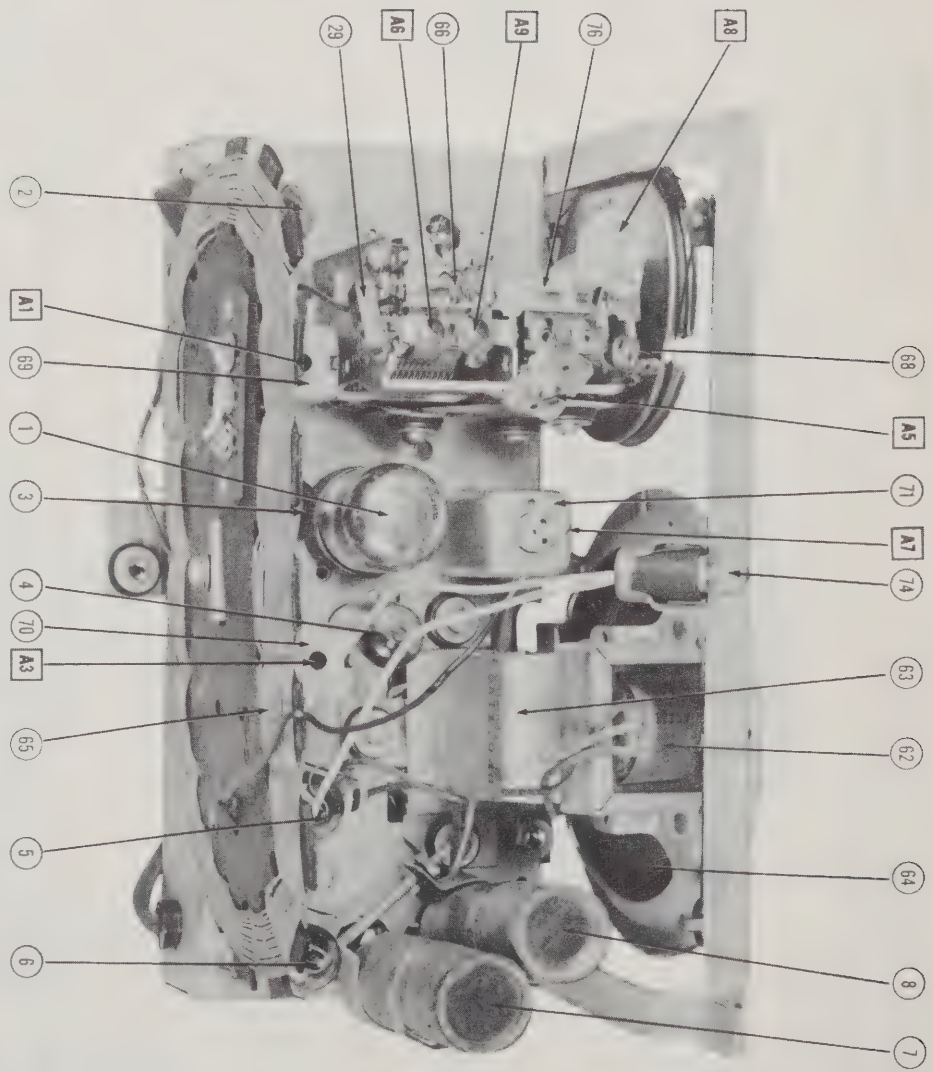
ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	AIRCASTLE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
7	80	150		PRSA-150/40-40*	BR8015	*DSB-2x40-150	TA440*	Filter-Yellow-Red
8A	40	150		PRSA40302	EDL5315C	DSB 303	TA440	Filter-Red
B	40	150					TA-25	-Yellow
C	20	25						-Green
9	10	25		PRS25/10	BR102A	M-10-25	TA-10	Stabilizing Cap.
10	.01	400		484-.01	DT4S1	ST-4-01	TC-11	Line Filter
11	.002	600		684-.002	DT6D2	ST-6-002	TC-22	Output Plate Bypass
12	.02	200		484-.02	DT2S2	ST-4-02	TC-12	Audio Coupling
13	.01	400		484-.01	DT4S1	ST-4-01	TC-11	" "
14	.02	200		484-.02	DT2S2	ST-4-02	TC-12	" "
15	.01	100		484-.01	DT2S1	ST-4-01	TC-11	Conv. Decoupling
16	.05	200		484-.05	DT2S5	ST-4-05	TC-15	AVC Bypass
17	.1	400		484-.1	DT4P1	ST-4-01	TC-11	RF Bypass Pwr. Supply
18	.2	200		484-.2	DT4P2	ST-4-2	TC-2	Line Isolation
19	.005	400		484-.005	DT4D5	ST-4-005	TC-25	RF Bypass
20	250	500		1468-.00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
21	100	300		1468-.0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter-Cer.
22	100	500		1468-.0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
23	50	500		1469-.00005	5R5Q5	MOS.5-45	MS-45	Osc. Grid Cap.
24	15	300					MS-415	Fixed Trimmer-Cer.
25	500	300		1468-.0005	5W5T5	MO.5-35	1FM-35	RF Bypass-Cer.
26	1000	500		1468-.001	1W5D1	MW.5-21	1FM-21	De-emphasis
27	4300	500		1467-.005	1D5D5	MW.5-25	1FM-25	RF Bypass
28	4300	300		1467-.005	1D5D5	MW.5-25	1FM-25	RF Bypass
29	500	500		1469-.0005	5W5T5	MOS.5-35	MS-35	Fixed Padder
30	3200	500						Quench Network
31	25	500		1469-.000025	5R5Q25	MOS.5-425	MS-425	Osc. Grid Cap.
32	500	300		1468-.0005	5W5T5	MO.5-35	1FM-35	RF Bypass-Cer.
33	2	300						Osc. Coupling-Cer.
34	2	300						Ant. Coupling-Cer.
35	500	300		1468-0005	5W5T5	MO.5-35	1FM-35	Osc. Feedback-Cer.
36	30	500			5W5Q3	MO.5-43	1FM-43	Regenerative Feedback-Cer
37	30	500		1468-.000025	5W5Q3	MO.5-43	1FM-43	" "
38	500	300		1468-.0005	5W5T5	MO.5-35	1FM-35	Rectifier Bypass-Cer.
39	100	500		1468-.0001	5W5T1	MO.5-31	1FM-31	Line Ant. Coupling
40	100	500		1468-.0001	5W5T1	MO.5-31	1FM-31	Filament Bypass

*Parallel sections to obtain desired capacity.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	AIRCASTLE PART No.	IRC PART No.	CLAROSTAT PART No.	
41A	500KΩ	½		D13-133	M-60-Z	Volume Control
B	Shaft			A	Not Req.	Attach to 41A per instructions
C	Switch			41	SW-A	" " " " "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	AIRCASTLE PART No.	IRC PART No.	
42	22KΩ	½		BTS-22K	Red-Red-Or. Osc. Grid
43	470Ω	½		BTS-470	Yl.-Vi.-Br. Conv. Decoup.
44	2 Meg.	½		BTS-2 Meg.	Red-Blk.-Grn. AVC Network
45	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Diode Filter
46	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
47	220KΩ	½		BTS-220K	Red-Red-Yl. AF Plate
48	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
49	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
50	15KΩ	2		BTS-15K	Br.-Grn.-Or. FM IF Transformer Shunt
51	150KΩ	½		BTS-150K	Br.-Grn.-Yl. Voltage Dropping
52	1500Ω	½		BTS-1500	Br.-Grn.-Red Quench Network
53	100KΩ	½		BTS-100K	Br.-Blk.-Yl. De-emphasis
54	22KΩ	½		BTS-22K	Red-Red-Or. Conv. Cathode
55	120Ω	½			Br.-Red-Br. FM Osc. Decoup.
56	22KΩ	½		BTS-22K	Red-Red-Or. FM Osc. Grid
57	1200Ω	½		BTS-1200	Br.-Red-Red Decoup.
58	820Ω	1		BTA-820	Gray-Red-Br. Filter
59	220KΩ	½		BTS-220K	Red-Red-Yl. Line Isolation
60	1000Ω	½		BTS-1000	Br.-Blk.-Red IF Cathode
61	1200Ω	½		BTS-1200	Br.-Red-Red Bleeder

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		AIRCASTLE PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
62	5000Ω	3.2Ω	360Ω	.4Ω	Part of LSA11.046	A-3877	T22S46	A-2930	

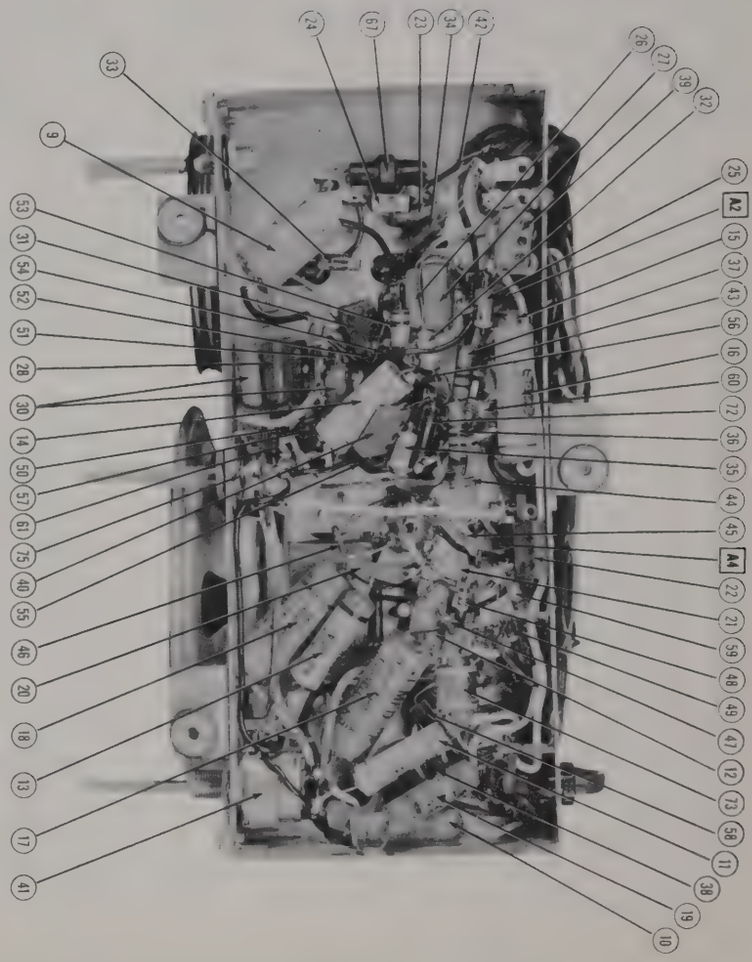
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			AIRCASTLE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-105#		
63	PM	3.2Ω	LSA11.046	Mod. P5-X	5A15#	#Drill and tap magnet frame.
	CONE DIA.	VC DIA.				
64	4-5/8"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	AIRCASTLE PART No.	MEISSNER PART No.	
65	Loop Ant.	0Ω	1.2Ω			
66	FM Ant.Coil		0Ω			
67	BC Osc. "		5.8Ω		14-1060†	†Add 50 MMFD from high side of tuning cap. to osc. grid.
68	FM " "		0Ω			
69	AM Input IF	16Ω	16.2Ω		16-6678	
70	AM Output IF	16Ω	15.0Ω		16-6678	
71	FM IF	3.3Ω	.4Ω			
72	FM RF Choke		1.2Ω			
73A	Line Choke		0Ω			
B	" "		0Ω			

CHASSIS—BOTTOM VIEW



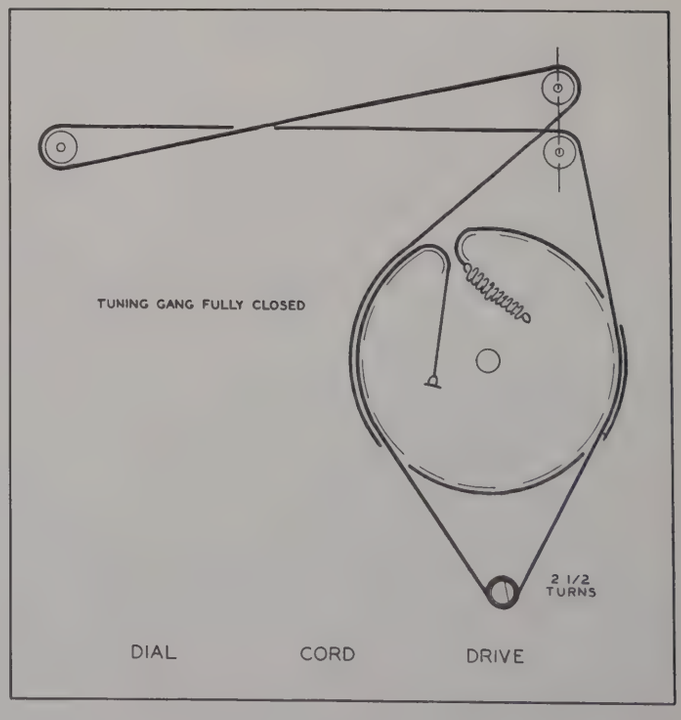
PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					AIRCASTLE PART No.		
74	Bayonet	7.5	0.2	White			Type 51

MISCELLANEOUS

ITEM No.	PART NAME	AIRCASTLE PART No.	NOTES
75	Switch		Band
76	Tuning Gan,		(20-215 MMF, 20-200MF)



DATE 11/48-#4820-2 SCT #50-FOLDER #2

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡ 1	14F8	60VDC	0V.	115VDC	65VDC	0V.	120VDC	11VAC	-1VDC§
2	12BE6	-9.6VDC§	0V.	25VAC	40VAC	105VDC	105VDC	-.2VDC	-
3	12BA6	-.4VDC	0V.	40VAC	55VAC	110VDC	110VDC	2VDC	-
4	12AT6	-.4VDC	0V.	11VAC	25VAC	-.4VDC	-.4VDC	80VDC	-
5	35B5	0V.	6.2VDC	55VAC	85VAC	115VDC	110VDC	0V.	-
6	35W4	0V.	0V.	85VAC	117VAC	115VAC	115VAC	135VDC	-

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡ 1	14F8	180KΩ	0Ω	31KΩ	24KΩ	1.2Ω	31KΩ	12Ω	22KΩ
2	12BE6	22KΩ	0Ω	24Ω	36Ω	30KΩ	30KΩ	2.7 Meg.	-
3	12BA6	2.7 Meg.	1KΩ	36Ω	48Ω	30KΩ	30KΩ	1KΩ	-
4	12AT6	10 Meg.	0Ω	12Ω	24Ω	2.7 Meg.	550KΩ	250KΩ	-
5	35B5	470KΩ	150Ω	48Ω	80Ω	30KΩ	30KΩ	470KΩ	-
6	35W4	INF.	INF.	80Ω	110Ω	105Ω	105Ω	30KΩ	-

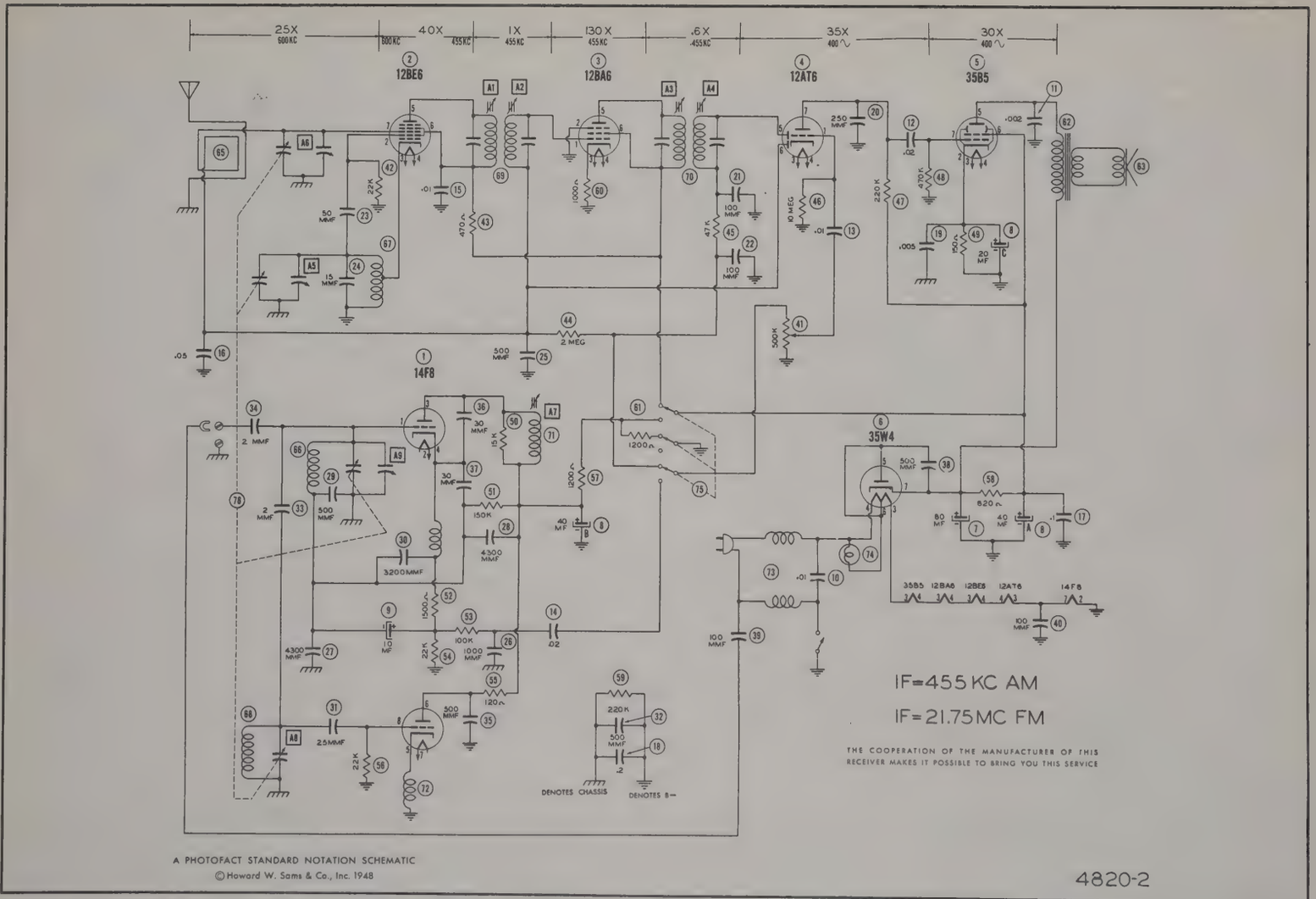
§TAKEN WITH VACUUM TUBE VOLTMETER.

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

DATE 11/48-#4820-2 SET #50-FOLDER #2



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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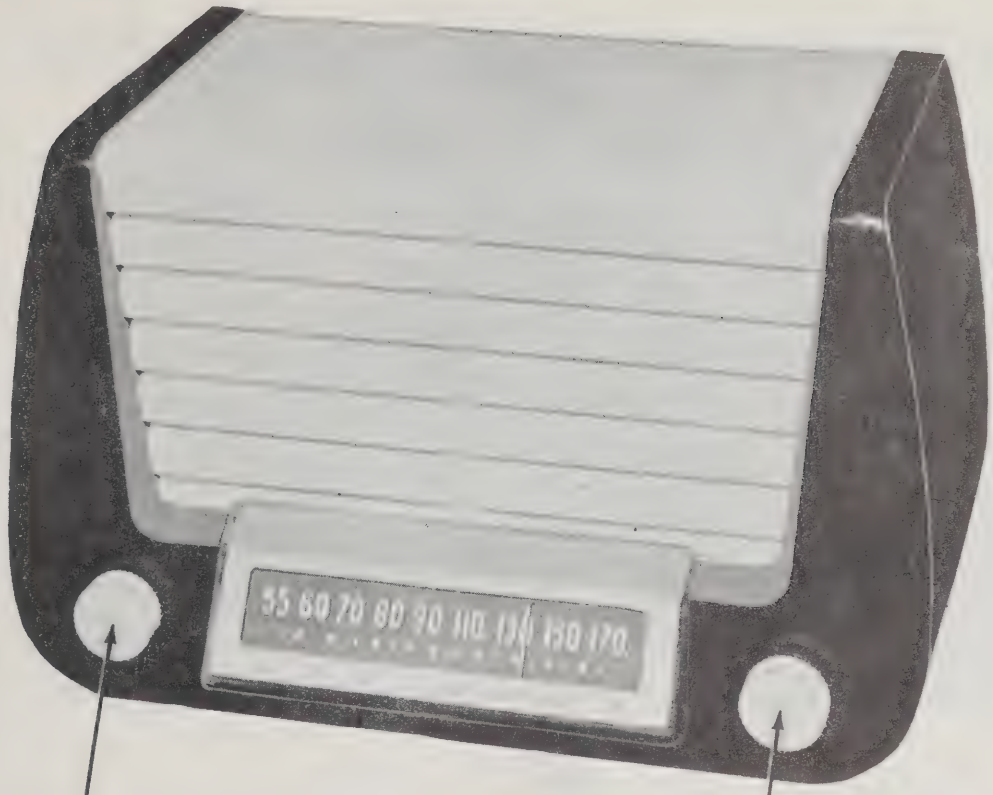
4820-2

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



AIR KING
MODEL A-625

AIR KING
MODEL A-625

AIR KING MODEL A-625

TRADE NAME	Air King, Model A-625
MANUFACTURER	Air King Products Co., 170-53rd St., Brooklyn 19, New York
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 12SK7GT RF Amp., 12SA7GT Converter, 12SK7GT IF Amp., 12SQ7GT Det.-AVC-AF, 35L6GT Power Output, 35W4 Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1600 KC RATING .22 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 8 (grid))of 12SA7 Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	200MMFD	High side to ext. ant. lead. Low side to chassis.	1600KC	"	"	A5	Adjust for maximum output.
3	200MMFD	"	1400KC	Tune for maximum output.	"	A6	" " " "

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PARTS LIST AND DESCRIPTIONS

AIR KING
MODEL A-625

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		AIR KING PART No.	STANDARD REPLACEMENT		
1	RF Amp.	12SK7GT	12SK7GT	8N	
2	Converter	12SA7GT	12SA7GT	8AD	
3	IF Amp.	12SK7GT	12SK7GT	8N	
4	Det.-AVC-AF	12SQ7GT	12SQ7GT	8Q	
5	Power Output	35L6GT	35L6GT	7AC	
6	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	AIR KING PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
7A	40	150		PRSA150-40-40	EDL4415	DSB-2x40-150	TA-440	Filter-Red
B	40	150						" -Green
8	.05	600		684-05	DT6S5	ST-6-05	TC-15	Line Filter
9	.01	400		484-01	DT4S1	ST-4-01	TC-11	Output Plate Bypass
10	.02	400		484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
11	.25	200		484-.25	DT2P25	ST-2-25	TC-2	RF Bypass Pwr. Supply
12	.01	400		484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
13	.05	600		684-05	DT6S5	ST-6-05	TC-15	AVC Filter
14	.006	600		684-006	DT6D6	ST-6-006	TC-26	Ext. Ant. Isolation
15	51	500		1468-00005	5W5Q5	MO.5-45	1FM-45	AF Plate Bypass
16	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	Diode Filter-Cer.
17	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	" " "
18	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling-Cer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	AIR KING PART No.	IRC PART No.	CLAROSTAT PART No.	
19A	500KΩ	½	2478	D13-133	M-60-Z	Volume Control
B	Shaft			A	Not Req.	Attach to 19A per instructions
C	Switch			41	SW-A	" " " " "

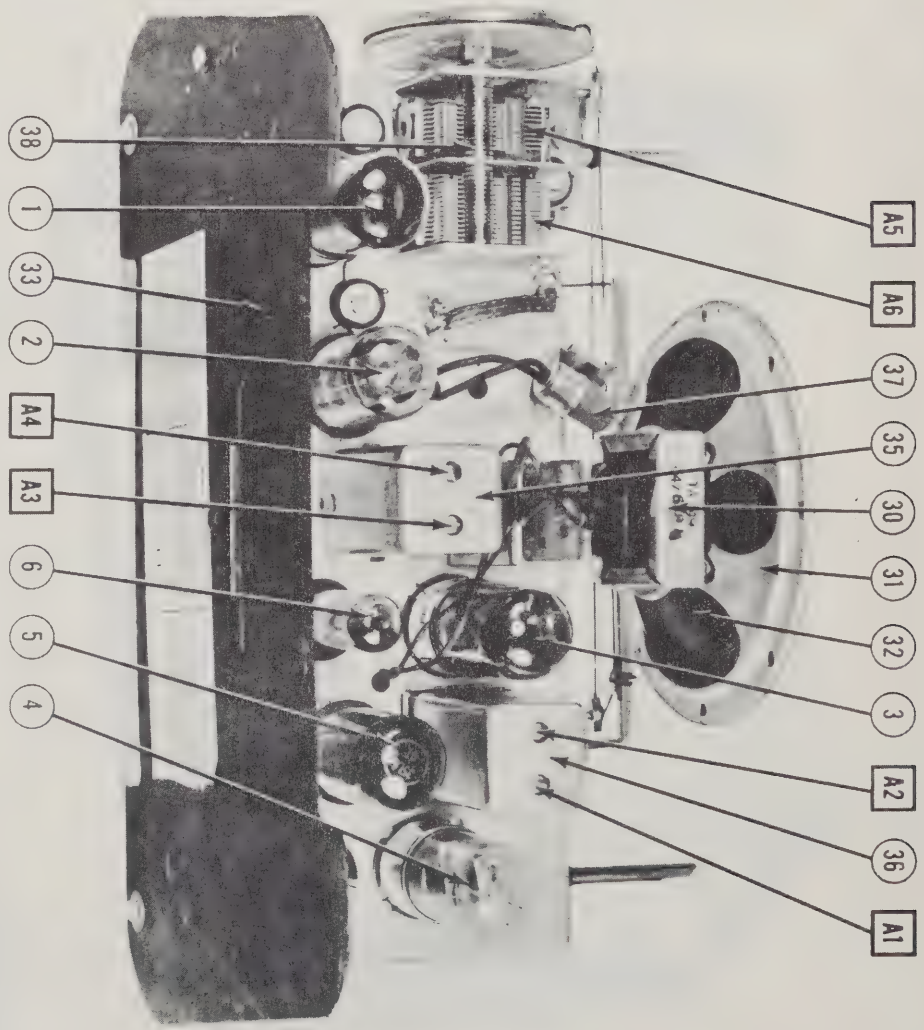
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	AIR KING PART No.	IRC PART No.	
20	4700Ω	½		BTS-4700	Yl.-Vl.-Red RF Plate Load
21	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Conv. Grid
22	18KΩ	½		BTS-18K	Br.-Gray-Or. Osc. Grid
23	2 Meg.	½		BTS-2.2 Meg.	Red-Blk.-Grn. AVC Network
24	68KΩ	½		BTS-68K	Blue-Gray-Or. Diode Filter
25	5 Meg.	½		BTS-4.7 Meg.	Grn.-Blk.-Grn. AF Grid
26	220KΩ	½		BTS-220K	Red-Red-Yl. AF Plate Load
27	330KΩ	½		BTS-330K	Or.-Or.-Yl. Output Grid
28	2200Ω	2		BT-2-2200	Red-Red-Red Filter
29	18Ω	½		BW-½-18	Br.-Gray-Blk. Rectifier Ballast

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		AIR KING PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
30	3700Ω	2.6Ω	230Ω	.6Ω	TA-149	A-3856#	T22846#	A-2930#	#Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: AIR KING PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-105†		†Drill and tap magnet frame.
31	PM	2.6Ω	5866	Mod. P5-X	5A07†	
	CONE DIA.	VC DIA.				
32	4-5/8"	9/16"				

R F COILS

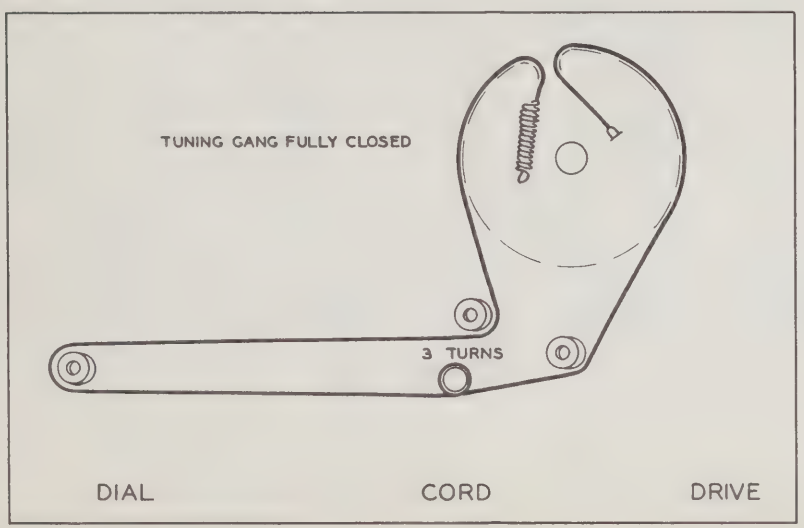
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: AIR KING PART No.	MEISSNER PART No.	
33	Loop Ant.	.2Ω	3Ω	28179		
34	Osc. Coil		9.3Ω	28210	14-1060*	*Add 50 MMFD cap. from high side of tuning cap. to osc. grid.
35	Input IF	20.5Ω	21.2Ω	3371	16-6658	
36	Output IF	32Ω	32Ω	3535	16-6660	

DIAL LIGHT

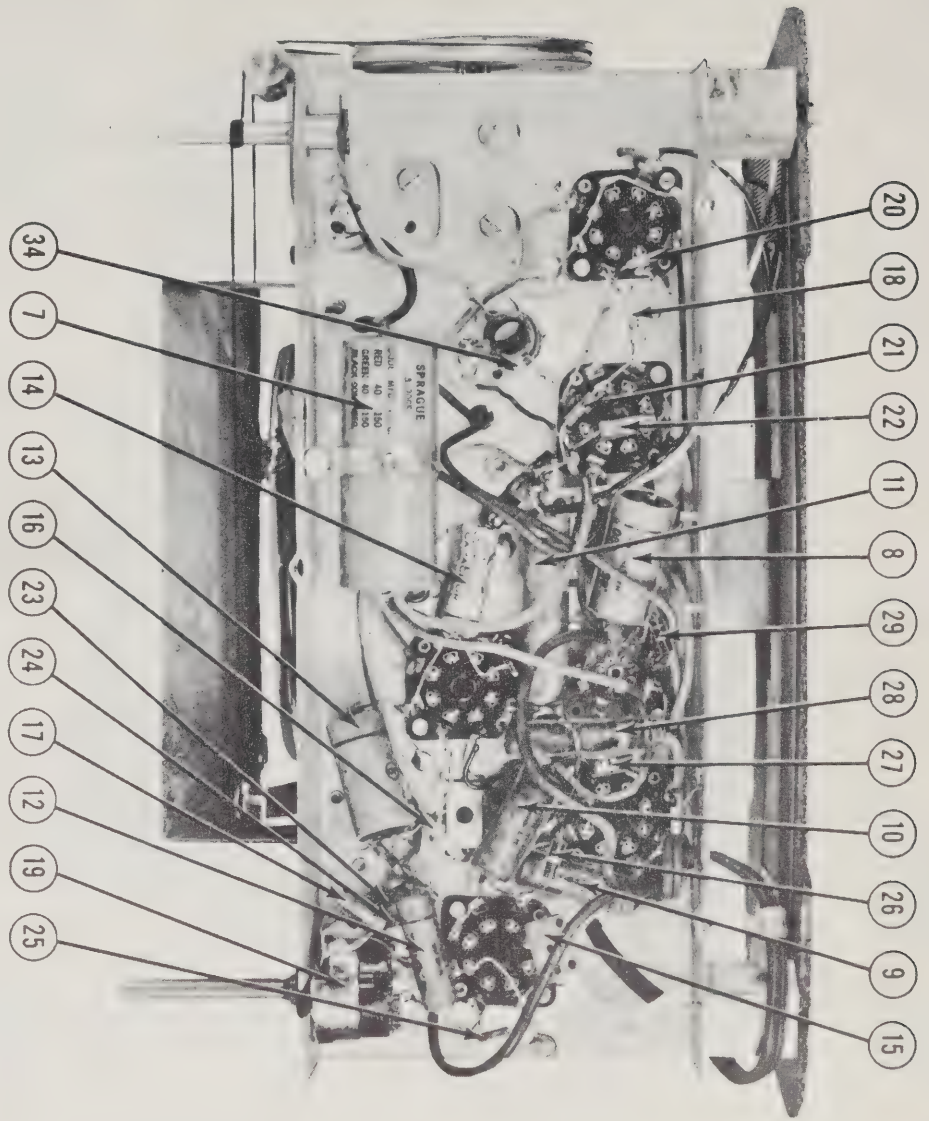
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: AIR KING PART No.		INSTALLATION NOTES
37	Bayonet	6-8	0.15	Brown			Type #47

MISCELLANEOUS

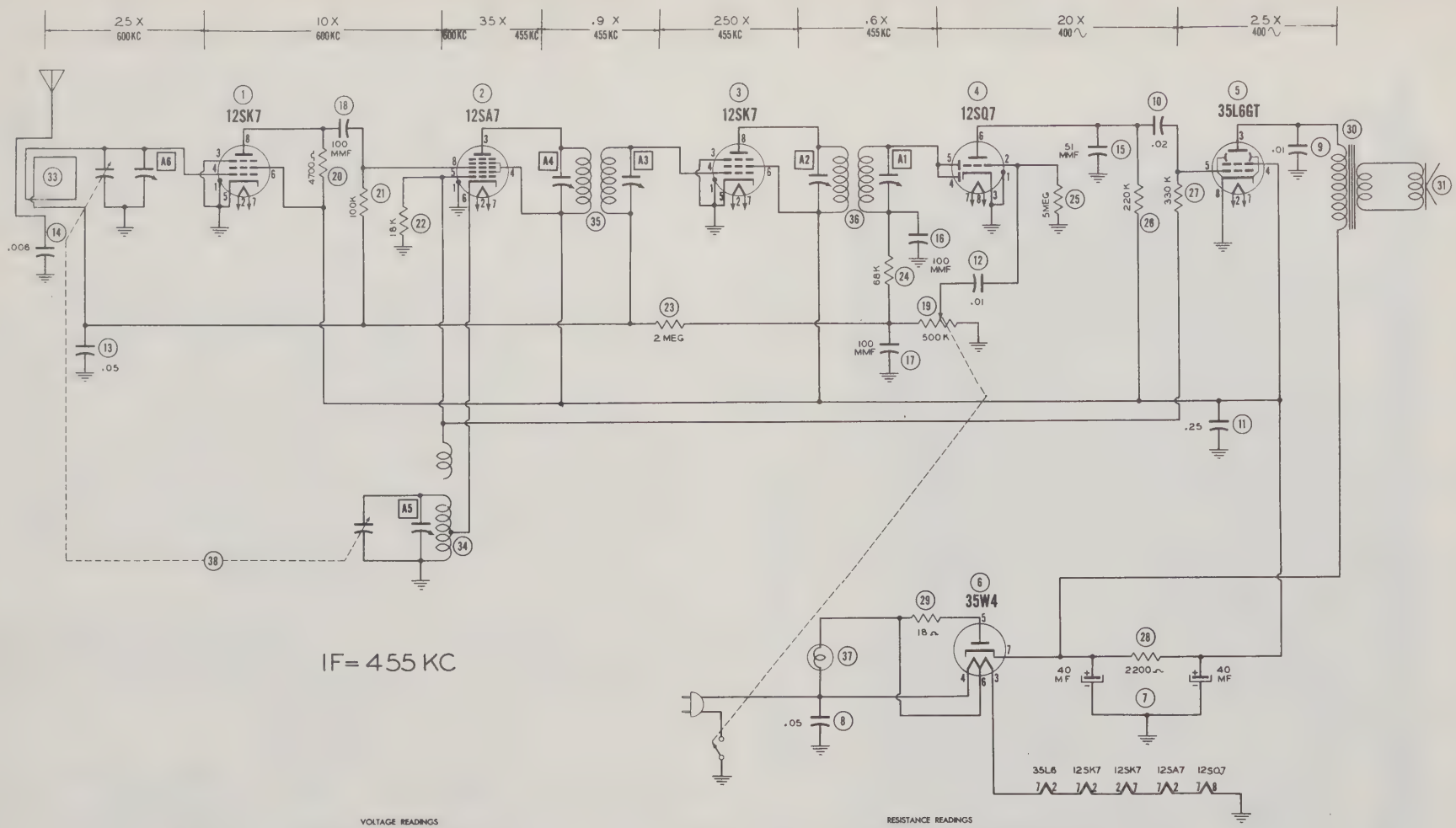
ITEM No.	PART NAME	AIR KING PART No.	NOTES
38	2 Gang Var. Cap	1672	(30-430MMF, 13-173MMF)
	Cabinet	8-1000	
	Dial Pointer	4144	



CHASSIS—BOTTOM VIEW



AIR KING MODEL A-625



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SK7GT	0V.	38VAC	0V.	-.7VDC	0V.	65VDC	25VAC	30VDC
2	12SA7GT	0V.	15VAC	65VDC	65VDC	-4.6VDC§	0V.	25VAC	-.6VDC
3	12SK7GT	0V.	38VAC	0V.	-.6VDC	0V.	65VDC	50VAC	65VDC
4	12SQ7GT	0V.	-.8VDC	0V.	-.7VDC	-.7VDC	50VDC	15VAC	0V.
5	35L6GT	0V.	50VAC	110VDC	65VDC	-1.6VDC	-2VDC	85VAC	0V.
6	35W4	0V.	0V.	85VAC	117VAC	110VAC	113VAC	115VDC	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SK7GT	0Ω	40Ω	0Ω	2.5 Meg.	0Ω	52KΩ	27Ω	56KΩ
2	12SA7GT	0Ω	14Ω	52KΩ	52KΩ	18KΩ	1Ω	27Ω	2.6 Meg.
3	12SK7GT	0Ω	40Ω	0Ω	2.5 Meg.	0Ω	52KΩ	5.6Ω	52KΩ
4	12SQ7GT	0Ω	5 Meg.	0Ω	570KΩ	570KΩ	270KΩ	14Ω	0Ω
5	35L6GT	0Ω	56Ω	50KΩ	52KΩ	350KΩ	18KΩ	90Ω	0Ω
6	35W4	INF.	INF.	90Ω	112Ω	125Ω	106Ω	50KΩ	-

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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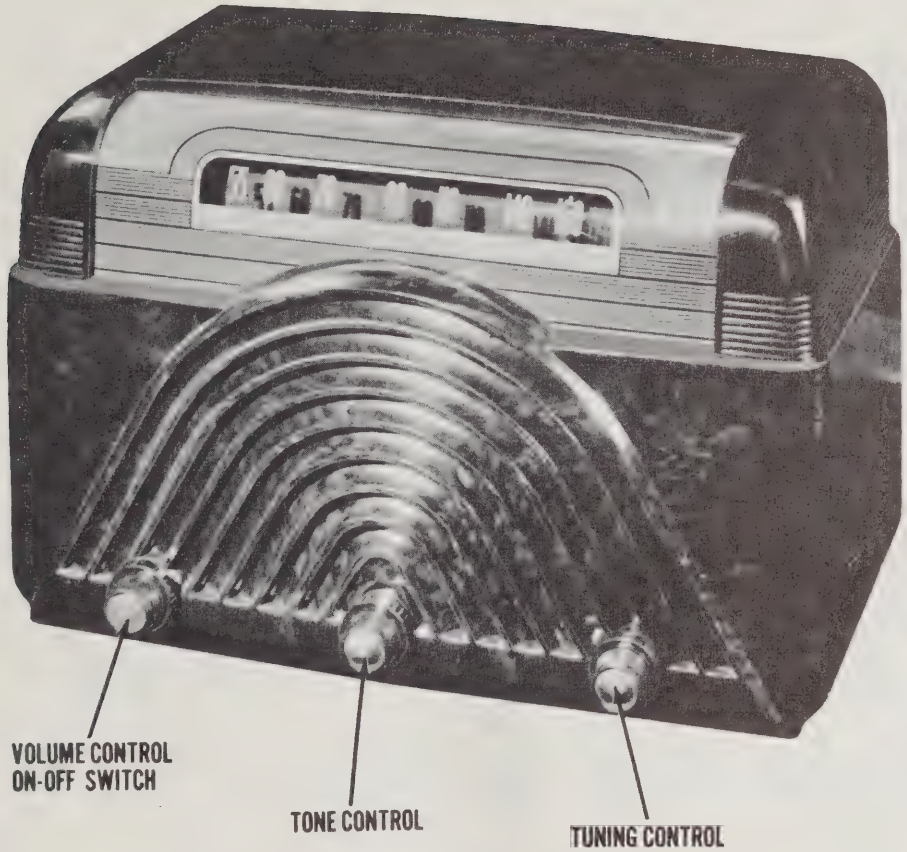
4820-3

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

CROSLEY MODELS
9-102, 9-118W



CROSLEY MODELS
9-102, 9-118W

CROSLEY MODEL 9-102

TRADE NAME	Crosley, Models 9-102, 9-118W
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio
TYPE SET	AC Operated Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 7A7 RF Amp., 7Q7 Converter, 7A7 IF Amp., 7B6 Det.-AVC-AF, 7B5 Power Output, 5AZ4 Rectifier.
POWER SUPPLY	105-125 Volts AC
TUNING RANGE—BROADCAST	540-1600KC RATING .43 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD.	High side to Pin 6 (grid) of 7Q7. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output.
2	4 MMFD.	High side to top ant. clip. Low side to chassis.	1620KC	"	"	A5	" " " "
3	4 MMFD.	"	1400KC	Tune for maximum output.	"	A6,A7	Rock tuning cap. and adjust for maximum output.

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DATE 11/48-#4820-4 SET #50-FOLDER #4

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	7A7	7A7	8V	
2	Converter	7Q7	7Q7	8AL	
3	IF Amp.	7A7	7A7	8V	
4	Det.-AVC-AF	7B6	7B6	8W	
5	Power Output	7B5	7B5	6AE	
6	Rectifier	5AZ4	5AZ4		

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CROSLEY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	50	300	B-136596	AF88J	UP431450*	DY-2x40-450		Filter-Red
B	30	300						" -Blue
8	.005	600	39001-11	684-005	GT6D5	ST-6-005	TC-25	Output Plate Bypass
9	.01	400	39001-13	484-01	GT4S1	ST-4-01	TC-11	Audio Coupling
10	.00025	600	39001-73	1468-00025	GT6T25	ST-6-00025	TC-325	AF Plate Bypass
11	.01	400	39001-13	484-01	GT4S1	ST-4-01	TC-11	Tone Compensation
12	.005	600	39001-11	684-005	GT6D5	ST-6-005	TC-25	" "
13	.001	600	39001-7	684-001	GT6D1	ST-6-001	TC-21	Audio Coupling
14	.01	600	39001-13	684-01	GT6S1	ST-6-01	TC-11	IF Plate Decoupling
15	.05	400	39001-17	484-05	GT4S5	ST-4-05	TC-15	IF Screen Bypass
16	.05	400	39001-17	484-05	GT4S5	ST-4-05	TC-15	Conv. Screen Bypass
17	.05	200	39001-17	484-05	GT2S5	ST-4-05	TC-15	AVC Filter
18	.001	600	39001-7	684-001	GT6D1	ST-6-001	TC-21	RF Coupling
19	12	300	C-137727-52	1468-00001	5W5Q1	MO.5-41	1FM-41	Osc. Grid Cap.-Cer.

*Parallel 40 MFD. & 10 MFD sections to obtain desired capacity and omit bypass section.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CROSLEY PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
20A	1 Meg.	½	39368-18	D13-137X		Volume Control B-136595 tapped @ 300KΩ
B	Shaft		39370-2	E		Attach to 20A per instructions
C	Switch		39369-1	41		" " " " "
21A	2 Meg.	½	39368-11	D13-139	AM-66-Z	Tone Control B-142857
B	Shaft		39370-2	E	KSS-3	Attach to 21A per instructions

RESISTORS

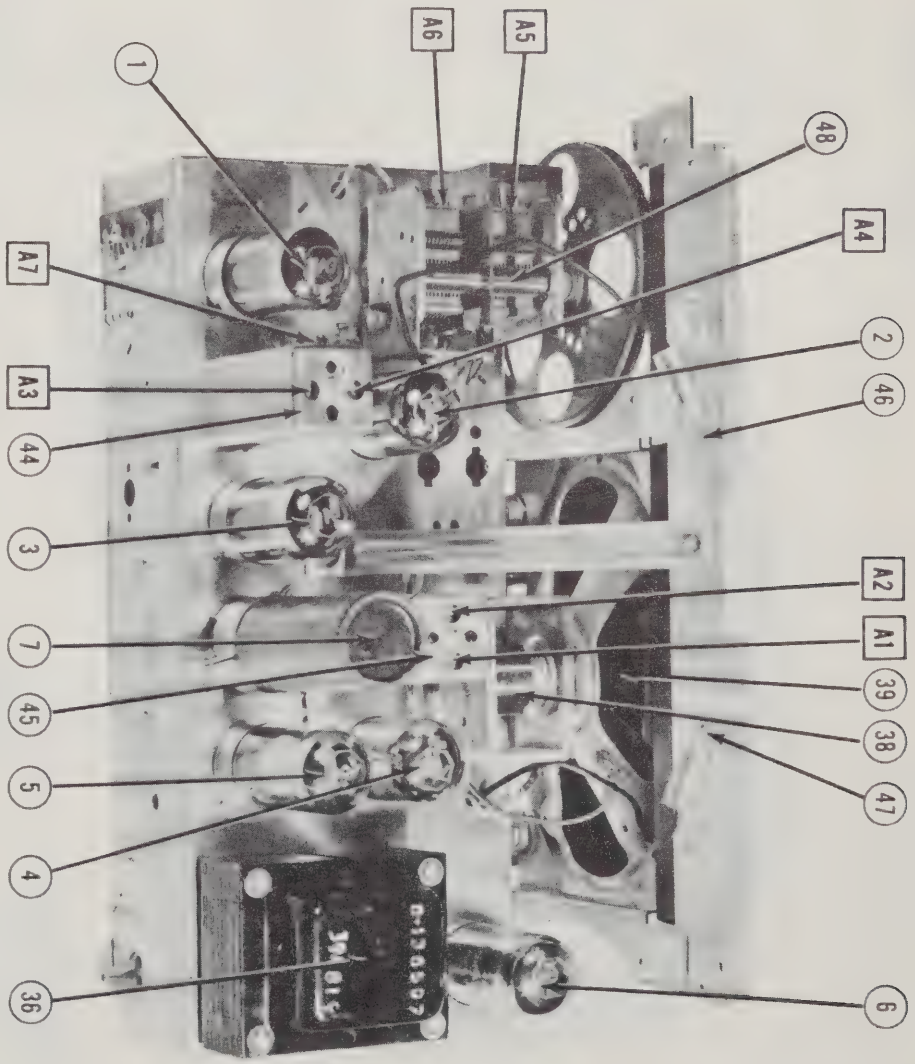
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CROSLEY PART No.	IRC PART No.	IDENTIFICATION CODES
22	2.2 Meg.	½	39373-97	BTS-2.2 Meg.	Red-Red-Grn. RF Grid
23	27KΩ	½	39373-82	BTS-27K	Red-Vi.-Or. RF Transformer Pri. Shunt
24	1 Meg.	½	39373-92	BTS-1 Meg.	Br.-Blk.-Grn. Conv. Grid
25	22KΩ	½	39373-60	BTS-22K	Red-Red-Or. Osc. Grid
26	12KΩ	2		BT-2-12K	Br.-Red-Or. Conv. Screen
27	22KΩ	½	39373-62	BTS-22K	Red-Red-Or. Screen Dropping
28	2200Ω	½	39373-40	BTS-2200	Red-Red-Red IF Plate Decoupling
29	2.2 Meg.	½	39373-97	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
30	47KΩ	½	39373-67	BTS-47K	Yl.-Vi.-Or. Tone Compensation
31	10 Meg.	½	39373-107	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
32	330KΩ	½	39373-84	BTS-330K	Or.-Or.-Yl. AF Plate Load
33	470KΩ	½	39373-87	BTS-470K	Yl.-Vi.-Yl. Output Grid
34	330Ω	½	39373-23	BW-½-330	Or.-Or.-Br. Output Cathode
35	1500Ω	2		BT-2-1500	Br.-Grn.-Red Filter

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: CROSLEY PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
36	117V AC @ .43A	520V CT .065A DC	4.7V AC @ 1.8A	6.5V AC @ 1.9A	B-136597	P-6011†	T22R02†	P-2951†

†Add series resistor to reduce plate voltage.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA CROSLEY PART No.	STANCOR PART No.	THORDAR'N - PART No.	MERIT PART No.	INSTALLATION NOTES
37	12KΩ	4.4Ω	900Ω	.7Ω	B-136598	A-3856#	T22847	A-2932	#Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA CROSLEY PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.				
38	PM	4.4Ω	138246		4GA1	
	CONE DIA.	VC DIA.				
39	4"x6"	9/16"				

R F COILS

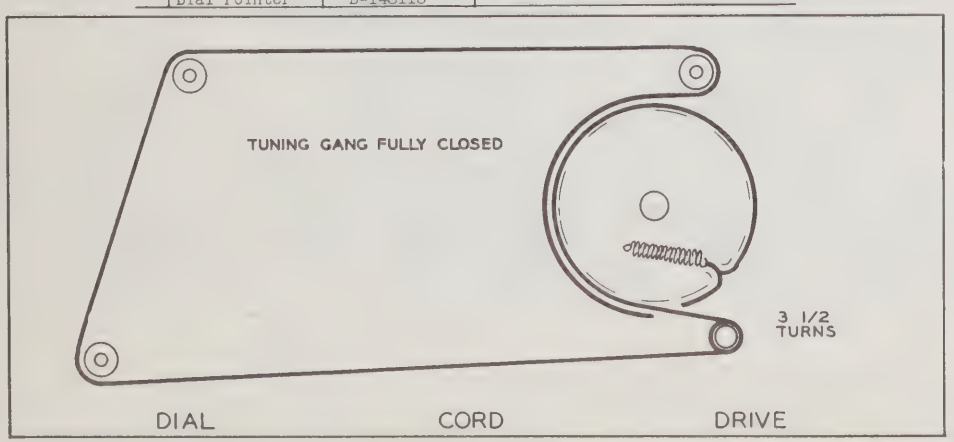
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA CROSLEY PART No.	MEISSNER PART No.	
40	Loop Ant.		.7Ω	AC-138464		
41	Ant. Load. Coil		5.8Ω	AW-138546		
42	RF Coil	137Ω	11.7Ω	AW-137800		
43	Osc. Coil		12.3Ω	AW-137724		
44	Input IF	10.8Ω	10.8Ω	AC-137933	16-6658	
45	Output IF	10.1Ω		AC-137934	16-6670	

DIAL LIGHT

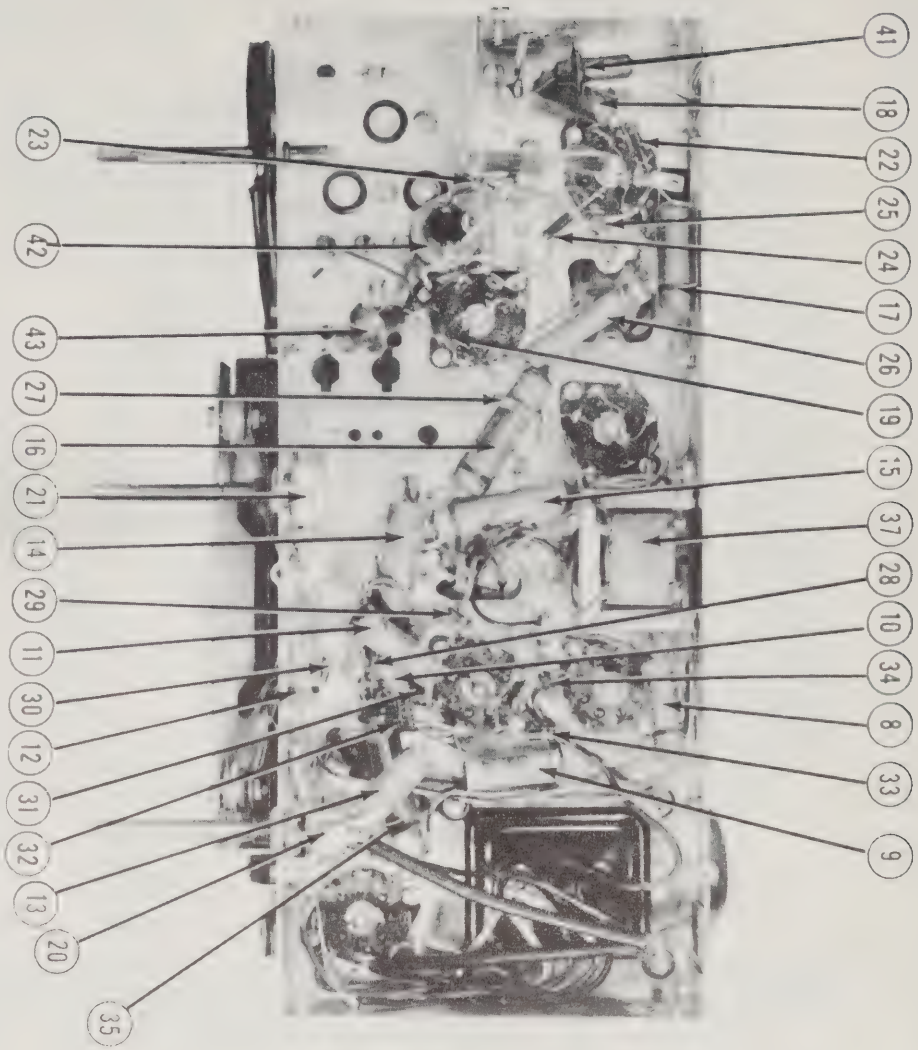
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA CROSLEY PART No.		INSTALLATION NOTES
46	Bayonet	6-8	0.15	Brown	W-48858		Type #47
47	"	"	"	"	"		" "

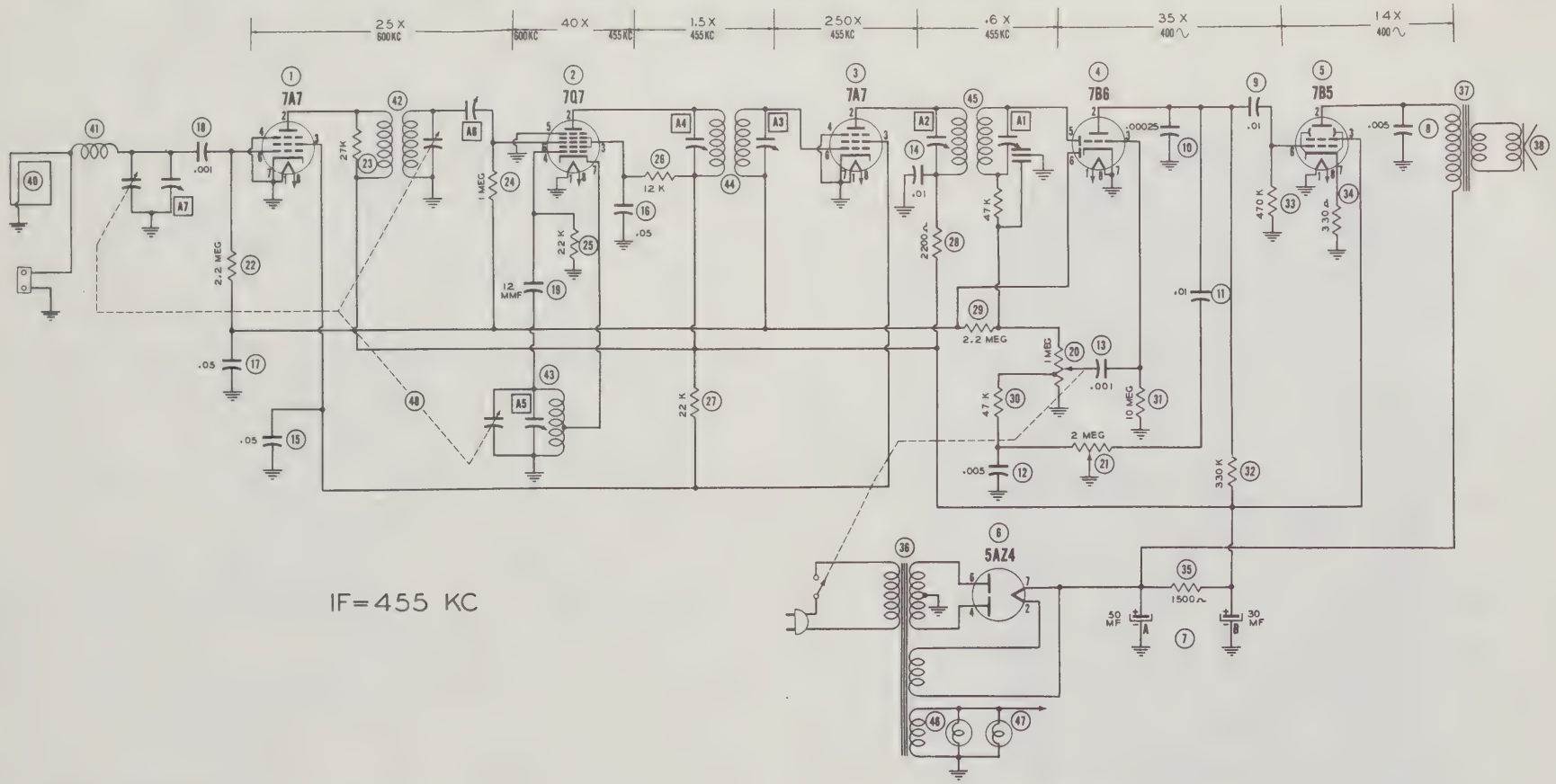
MISCELLANEOUS

ITEM No.	PART NAME	CROSLEY PART No.	NOTES
48	3 Gang Var. Cap.	AC-138595-2	(25-323MMF, 12-111MMF, 15-87MMF)
	Cabinet	R-138573-1	Model 9-102
	"	R-138573-2	Model 9-118W
	Dial	D-143031	
	Knob	B-138574-5	Model 9-102
	"	B-138574-2	Model 9-118W
	Dial Pointer	B-143115	



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A7	0V.	190VDC	80VDC	0V.	0V.	-.5VDC	0V.	6.5VAC
2	7Q7	0V.	190VDC	90VDC	-6.2VDC§	0V.	-.8VDC	0V.	6.5VAC
3	7A7	0V.	170VDC	80VDC	0V.	0V.	-.8VDC	0V.	6.5VAC
4	7B6	0V.	80VDC	-.8VDC	0V.	-.5VDC	-.8VDC	0V.	6.5VAC
5	7B5	0V.	225VDC	190VDC	0V.	0V.	0V.	10VDC	6.5VAC
6	5AZ4	0V.	250VDC	0V.	260VAC	0V.	260VAC	0V.	250VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A7	0Ω	280KΩ	220KΩ	0Ω	0Ω	5.4 Meg.	0Ω	.1Ω
2	7Q7	0Ω	200KΩ	210KΩ	22KΩ	0Ω	4.2 Meg.	1Ω	.1Ω
3	7A7	0Ω	200KΩ	220KΩ	0Ω	0Ω	3.2 Meg.	0Ω	.1Ω
4	7B6	0Ω	530KΩ	10 Meg.	0Ω	3.2 Meg.	1 Meg.	0Ω	.1Ω
5	7B5	0Ω	200KΩ	200KΩ	INF.	INF.	470KΩ	330Ω	.1Ω
6	5AZ4	INF.	200KΩ	INF.	215Ω	INF.	230Ω	INF.	200KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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4820-4

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

CROSLEY MODELS
9-119, 9-120W

CROSLEY MODELS
9-119, 9-120W

CROSLEY MODEL 9-120W

TRADE NAME	Crosley, Models 9-119, 9-120W
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12BE6 Converter, 12BA6 IF Amp., 12AT6 Det.-AVC-AF, 50B5 Power Output, 35W4 Rectifier.
POWER SUPPLY	105-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1600KC RATING .28 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	200MMFD	High side of sig. gen. to pin 1 (grid) of 12BE6. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2,	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1620KC	"	"	A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. The trimmer opposite A3 is a factory adjustment and ordinarily need not be adjusted.
3		"	1400KC	Tune for maximum output.	"	A4	Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

CROSLEY MODEL 9-120W

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		CROSLEY PART No.	STANDARD REPLACEMENT		
1	Converter	12BE6	12BE6	7CH	
2	IF Amp.	12BA6	12BA6	7BK	
3	Det.-AVC-AF	12AT6	12AT6	7BT	
4	Power Output	50B5	50B5	7BZ	
5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	CROSLEY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
6A	50	150	136770	PRSA150/30-50	EDL5315	DSB-5030-150	TA-530	Filter-Red
B	30	150						" -Blue
7	.05	200	39001-17	484-05	GT2S5	ST-4-05	TC-15	Line Filter
8	.08	200	39001-19	484-.1	GT2P1	ST-2-1	72P2	Line Isolation
9	.02	200	39001-80	484-02	GT2S2	ST-4-02	TC-12	Output Plate Bypass
10	.02	200	39001-80	484-02	GT2S2	ST-4-02	TC-12	Audio Coupling
11	.003	600	39001-76	684-003	GT6D3	ST-6-003	TC-23	" "
12	.00025	600	39001-73	1468-00025	GT6T25	ST-6-00025	TC-325	AF Plate Bypass
13	.00025	600	39001-73	1468-00025	GT6T25	ST-6-00025	TC-325	Diode RF Filter
14	.00025	600	39001-73	1468-00025	GT6T25	ST-6-00025	TC-325	IF Coupling
15	.05	200	39001-17	484-05	GT2S5	ST-4-05	TC-15	AVC Filter
16	.01	400	39001-13	484-01	GT4S1	ST-4-01	TC-11	Bias Filter
17	50	300	137727-21	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.

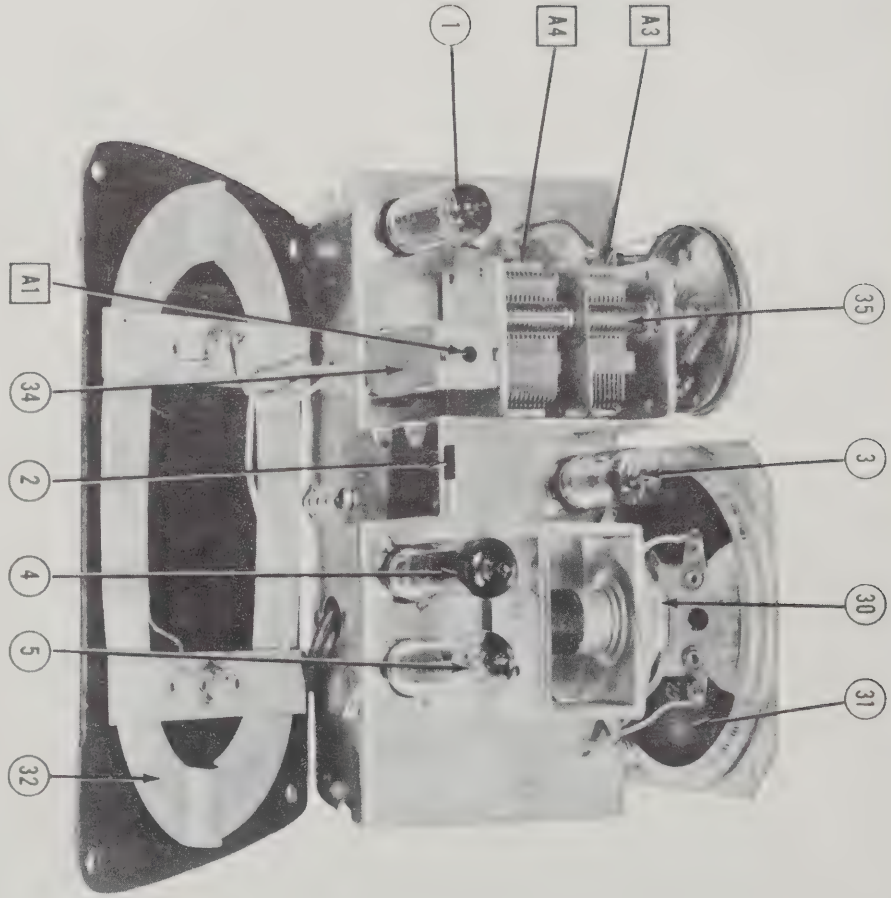
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	CROSLEY PART No.	IRC PART No.	CLAROSTAT PART No.	
18A	1 Meg.	½	39368-14	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 18A per instructions
C	Switch		39369-1	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	CROSLEY PART No.	IRC PART No.	
19	22KΩ	½	39373-60	BTS-22K	Red-Red-Or. Oscillator Grid
20	100Ω	½	39373-14	BW-½-100	Br.-Blk.-Br. Conv. Cathode
21	6800Ω	1	39373-161	BTA-6800	Blue-Gray-Red IF Plate
22	3.3 Meg.	½	39373-100	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
23	47KΩ	½	39373-67	BTS-47K	Yl.-Vi.-Or. Diode Filter
24	10 Meg.	½	39373-107	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
25	220KΩ	½	39373-80	BTS-220K	Red-Red-Yl. AF Plate Load
26	470KΩ	½	39373-87	BTS-470K	Yl.-Vi.-Yl. Output Grid
27	100Ω	½	39373-14	BW-½-100	Br.-Blk.-Br. Output Cathode
28	1200Ω	1	39373-144	BTA-1200	Br.-Red-Red Filter

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

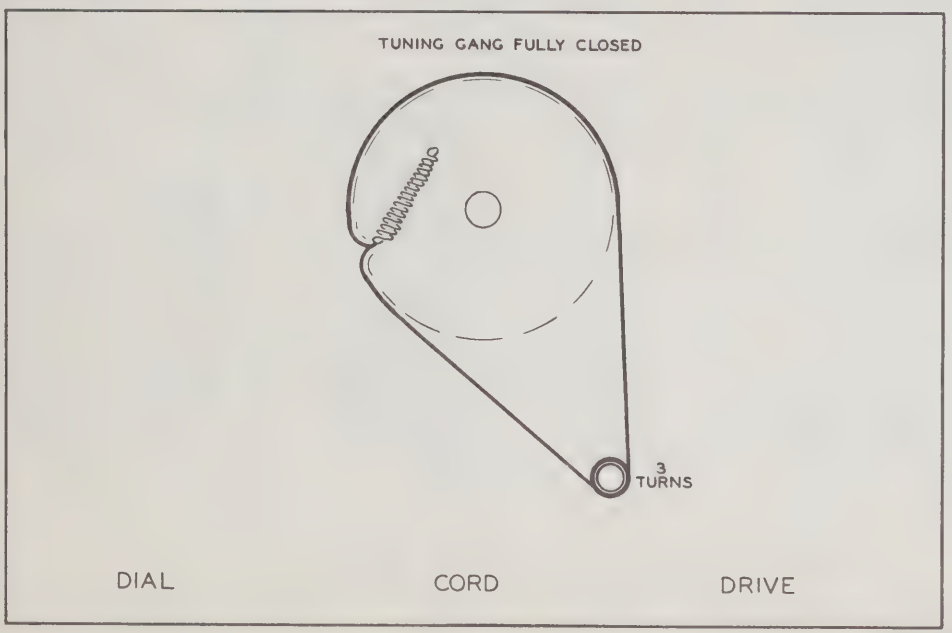
ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		CROSLEY PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
29	21000Ω	3.7Ω	230Ω	1Ω	138131-1	A-3876#	T22S45#	A-2928#	#File mounting holes to fit replacement. Original Part #B-137723.

SPEAKER

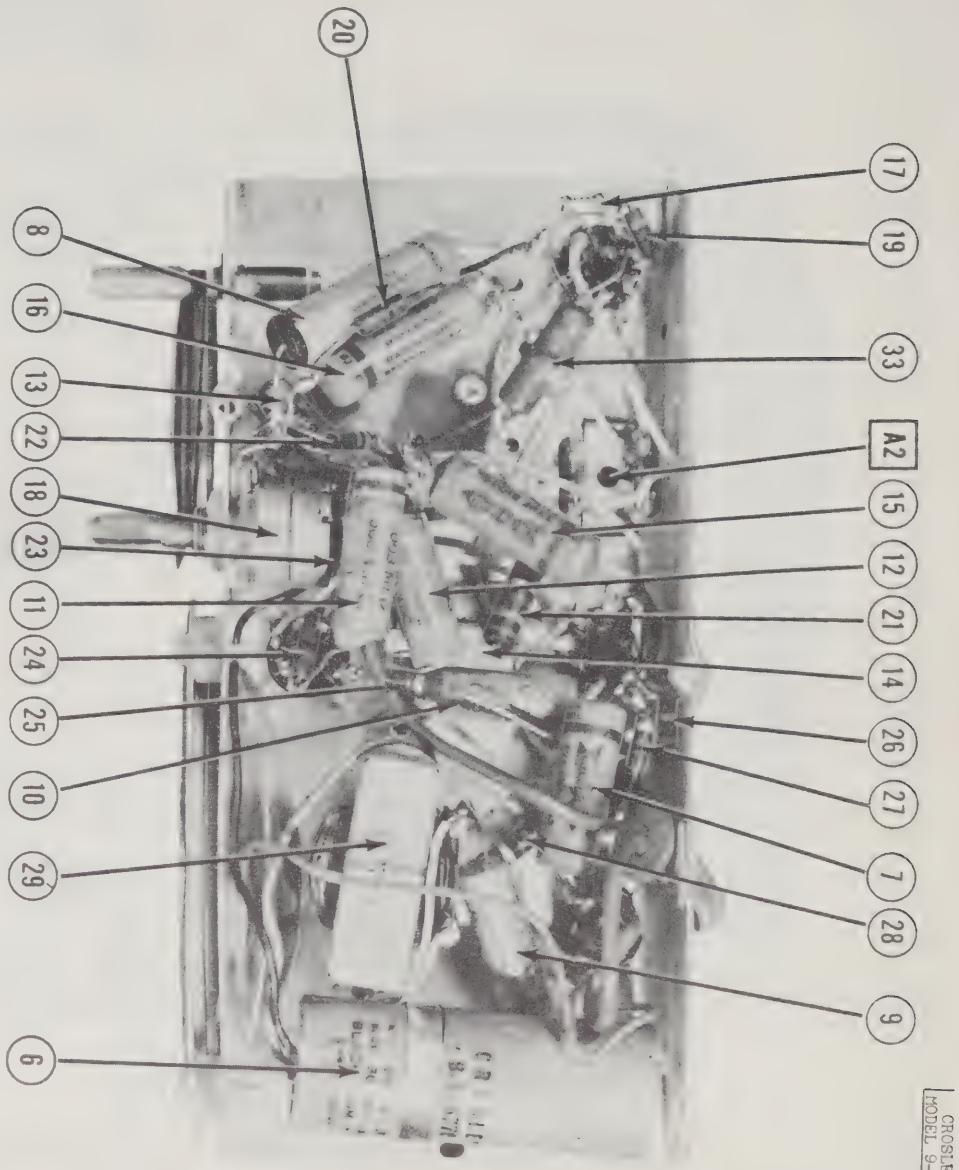
ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			CROSLEY PART No.	JENSEN PART No.	QUAM PART No.	
30	FIELD	VC IMP.	138459	ST-113	4A07	
	PM	3.7Ω		Mod. P4-X		
31	CONE DIA.	VC DIA.				
	4"	9/16"				

R F COILS

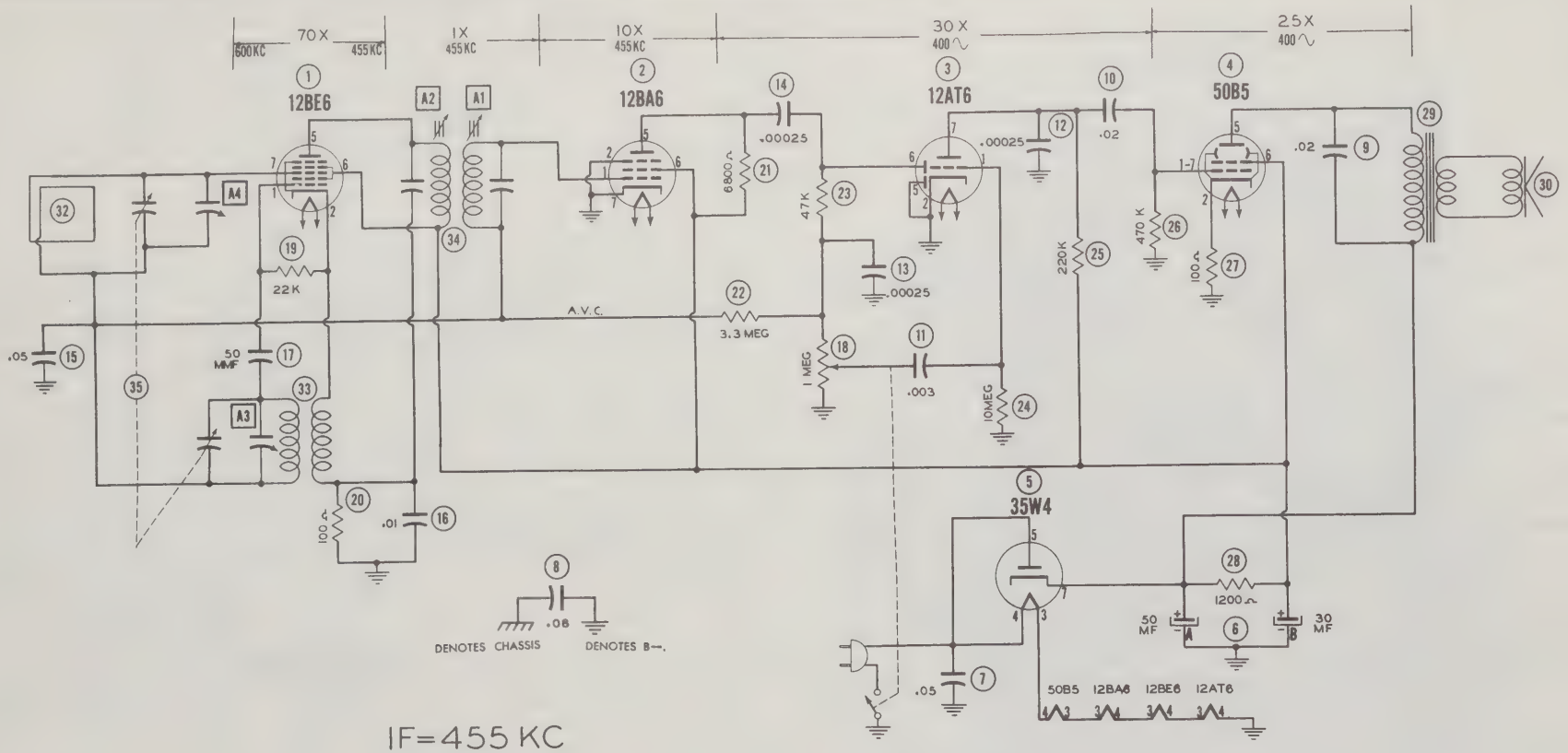
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	CROSLEY PART No.	MEISSNER PART No.	
32	Loop Ant.		1.3Ω	139873		
33	Osc. Coil	1Ω	8Ω	144325	14-1060	
34	IF Trans.	26Ω	26Ω	139919		



CHASSIS—BOTTOM VIEW



CROSLEY MODEL 9-120W



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	-5.8VDC§	.8VDC	25VAC	12VAC	95VDC	95VDC	-.7VDC
2	12BA6	-.6VDC	0V.	37VAC	25VAC	30VDC	95VDC	0V.
3	12AT6	-.6VDC	0V.	12VAC	0V.	0V.	-.4VDC	50VDC
4	50B5	0V.	5.6VDC	37VAC	85VAC	125VDC	95VDC	0V.
5	35W4	0V.	95VDC	85VAC	117VAC	117VAC	114VAC	137VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	22KΩ	100Ω	25Ω	12Ω	50KΩ	50KΩ	4.3 Meg.
2	12BA6	4.3 Meg.	0Ω	34Ω	25Ω	58KΩ	50KΩ	0Ω
3	12AT6	10 Meg.	0Ω	1.2Ω	0Ω	0Ω	1 Meg.	270KΩ
4	50B5	470KΩ	10Ω	34Ω	90Ω	50KΩ	50KΩ	470KΩ
5	35W4	INF.	50KΩ	90Ω	120Ω	120Ω	110Ω	50KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4820-5

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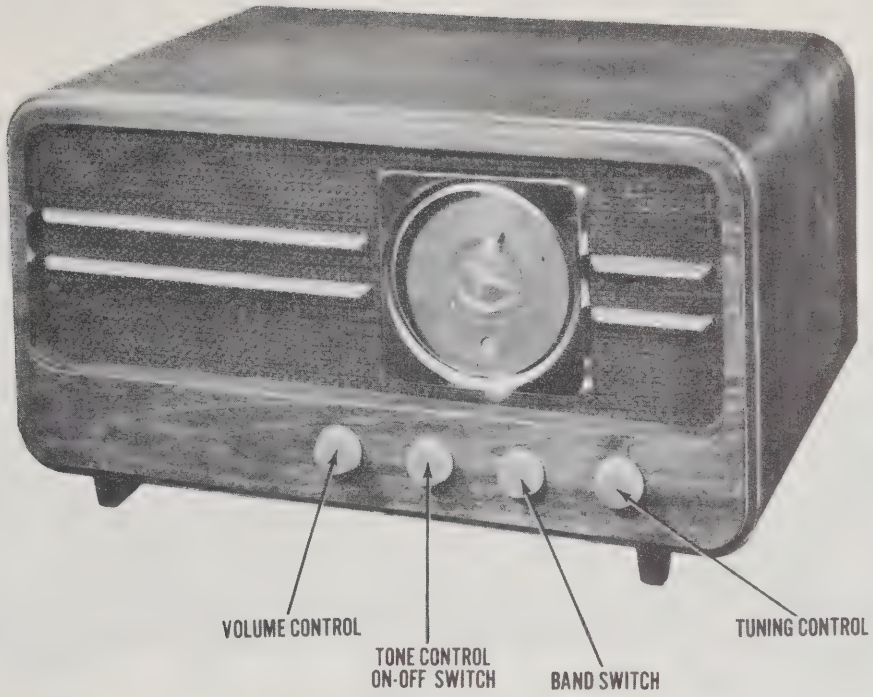
1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

DETROLA
MODEL 611-A BATTERY OPERATED



DETROLA MODEL 611-A

TRADE NAME	Detrola, Model 611-A
SUPPLIER	International Detrola Corp., 1501 Beard St., Detroit, Michigan
TYPE SET	Battery Operated 2 Band Superheterodyne Receiver
TUBES (FIVE)	Types, 1N5GT RF Amp., 1R5 Converter, 1N5GT IF Amp., 1H5GT Det.-AVC-AF, 3Q5GT Power Output
POWER SUPPLY	1.5 Volt "A" Supply and 90 Volt "B" Supply
RATING	310 MA @ 1.5V DC and 16MA @ 90V DC
TUNING RANGE—BROADCAST	540-1710KC **SHORT WAVE** 5.8-18.3MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD	High side to grid cap. of 1N5GT IF Amp. Low side to chassis.	455KC	BC (Counter-clock-wise)	550KC	Across voice coil	A1,A2	Adjust for maximum output
2	.05 MFD	High side to stator of front section of tuning capacitor. Low side to chassis.	"	"	"	"	A3,A4	" " " "
3	.05 MFD	High side to grid cap. of 1N5GT RF Amp. Low side to chassis.	1710KC	"	Tuning cap. fully open.	"	A5	" " " "
4	.05 MFD	"	1500KC	"	Tune for maximum output.	"	A6	" " " "
5	.05 MFD	"	600KC	"	"	"	A7	Rock tuning capacitor & adjust for maximum output. Repeat Steps 3, 4 and 5 until no further improvement can be made.
6	200 MMF	High side to ext. antenna post. Low side to chassis.	1500KC	"	"	"	A8	Adjust for maximum output
7	.05 MFD	High side to grid cap. of 1N5GT RF Amp. Low side to chassis.	18.3MC	SW (clock-wise)	Tuning cap. fully open.	Across voice coil	A9	" " " "
8	400Ω carbon res.	High side to ext. antenna post. Low side to chassis.	16MC	"	Tune for maximum output.	"	A10, A11	Rock tuning capacitor and adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

DETROLA MODEL 611-A

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: DETROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	1N5GT	1N5GT	5Y	
2	Converter	1R5	1R5	7AT	
3	IF Amp.	1N5GT	1N5GT	5Y	
4	Det.-AVC-AF	1H5GT	1H5GT	5Z	
5	Power Output	3Q5GT	3Q5GT	7AF	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: DETROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6	8	150	A-51300	PRS150-8	BR615	M-8-150	UT-81	Filter
7	.002	600	BD210302	684-002	DT6D2	ST-6-002	TC-23	Output Plate Bypass
8	.005	600	BD610502	684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
9	.001	600	BD610102	684-001	DT6D1	ST-6-001	TC-21	Tone Compensation
10	.005	600	BD610502	684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
11	.003	600	BD610203	684-003	DT6D3	ST-6-003	TC-23	" "
12	.05	200	BD210503	484-05	DT4S5	ST-4-05	TC-15	IF Grid
13	.005	600	BD610502	684-005	DT6D5	ST-6-005	TC-25	Osc. Feedback
14	.05	200	BD210503	484-05	DT4S5	ST-4-05	TC-15	AVC Filter
15	.05	400	BD410503	484-05	DT4S5	ST-4-05	TC-15	RF Bypass Pwr. Supply
16	.05	200	BD210503	484-05	DT4S5	ST-4-05	TC-15	AVC Filter
17	100	500	BM78A101	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass
18	3600	300	BM58D362					Fixed Pad
19	47	500	BM78A470	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.
20	3.3	500	B51839-5					RF Coupling
21	27	500	BM61A270	1468-000025	5W5Q3	MO.5-425	MS-425	" "

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DETROLA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
23A	2 Meg.	1	B-51275-1	D13-139	M-66-Z	Volume Control
B	Shaft		Not Req.	E	Not Req.	Attach to 22A per instructions
23A	1 Meg.	1	B-51276-2	D13-137		Tone Control
B	Shaft		Not Req.	E		Attach to 23A per instructions
C	Switch		" "	41		" " " " "

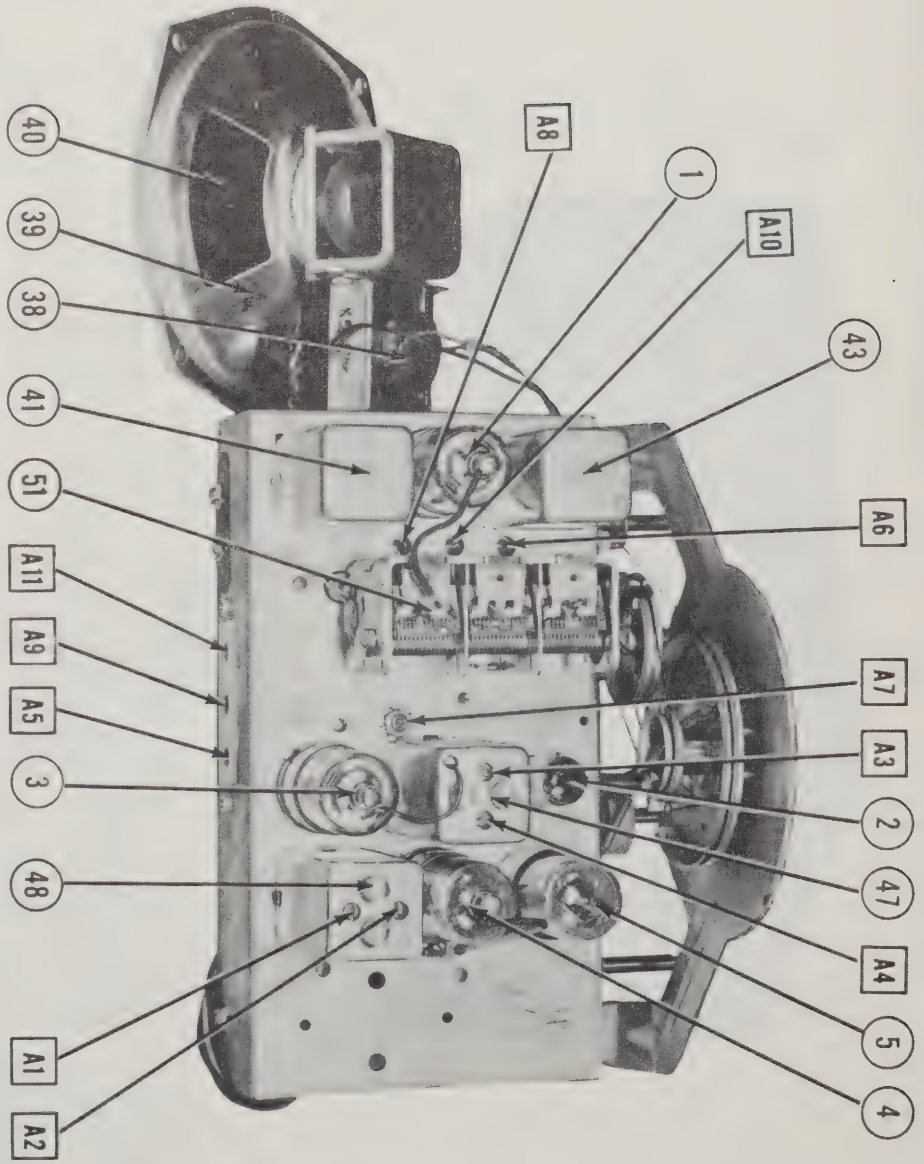
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DETROLA PART No.	IRC PART No.	IDENTIFICATION CODES
24	10KΩ	½	BR17B103	BTS-10K	Br.-Blk.-Or. Antenna Loading
25	15KΩ	½	BR17B153	BTS-15K	Br.-Grn.-Or. RF Coil Shunt
26	1 Meg.	½	BR17B105	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
27	150Ω	½	BR17B151	BW-½-150	Br.-Grn.-Br. Parasitic Suppressor
28	100KΩ	½	BR17B104	BTS-100K	Br.-Blk.-Yl. Oscillator Grid
29	2200Ω	½	BR17B222	BTS-2200	Red-Red-Red Parasitic Suppressor
30	100Ω	½	BR17B101	BW-½-100	Br.-Blk.-Br. " "
31	10KΩ	½	BR17B103	BTS-10K	Br.-Blk.-Or. Voltage Dropping
32	4.7 Meg.	½	BR17B475	BTS-4.7 Meg.	Yl.-Vi.-Grn. IF Grid
33	3.3 Meg.	½	BR17B335	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
34	470KΩ	½	BR16B474	BTS-470K	Yl.-Vi.-Yl. Diode Load
35	10 Meg.	½	BR17B106	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
36	1 Meg.	½	BR17B105	BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
37	330Ω	½	BR17B331	BW-½-330	Or.-Or.-Br. Bias

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: DETROLA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
38	6600Ω	3.5Ω	880Ω	.55Ω	B-54718-1	A-3878	T22S47	A2931	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: DETROLA PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-108		
39	PM	3.5Ω	B-54724	Mod. P6-X	6A15	
	CONE DIA.	VC DIA.				
44	6"	3/4"				

R F COILS

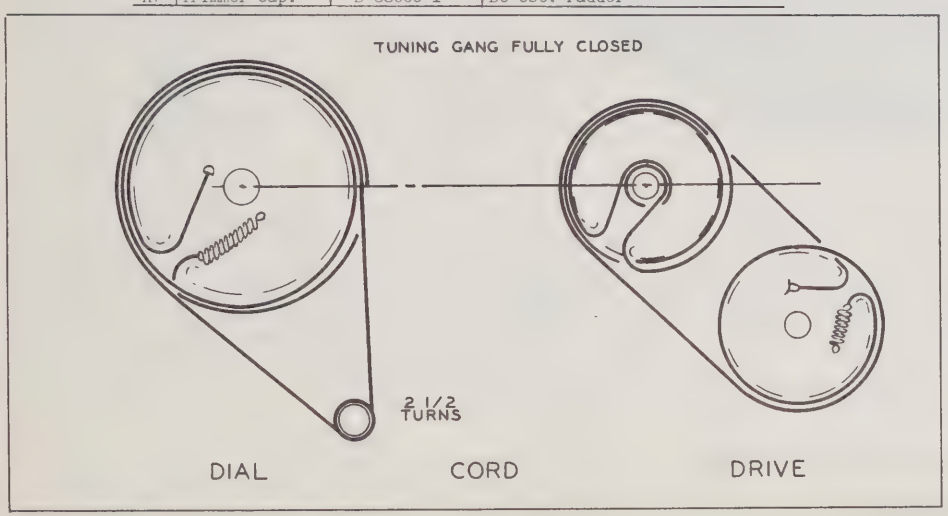
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: DETROLA PART No.	MEISSNER PART No.
41	BC Ant.Coil	77Ω	4Ω	B-51280	
42	SW " "	.2Ω	.1Ω	B-51284	
43	BC RF Coil	65Ω	3.8Ω	B-51279	
44	SW " "		0Ω	B-51285	
45	SW Choke Coil		5Ω	B-54413	
46A	BC Osc.	2.6Ω	6Ω	B-51296	
B	SW "	.8Ω	0Ω		
47	Input IF	13.5Ω	13.5Ω	A-51917-3	
48	Output IF	13Ω		B-51908-3	

BATTERIES

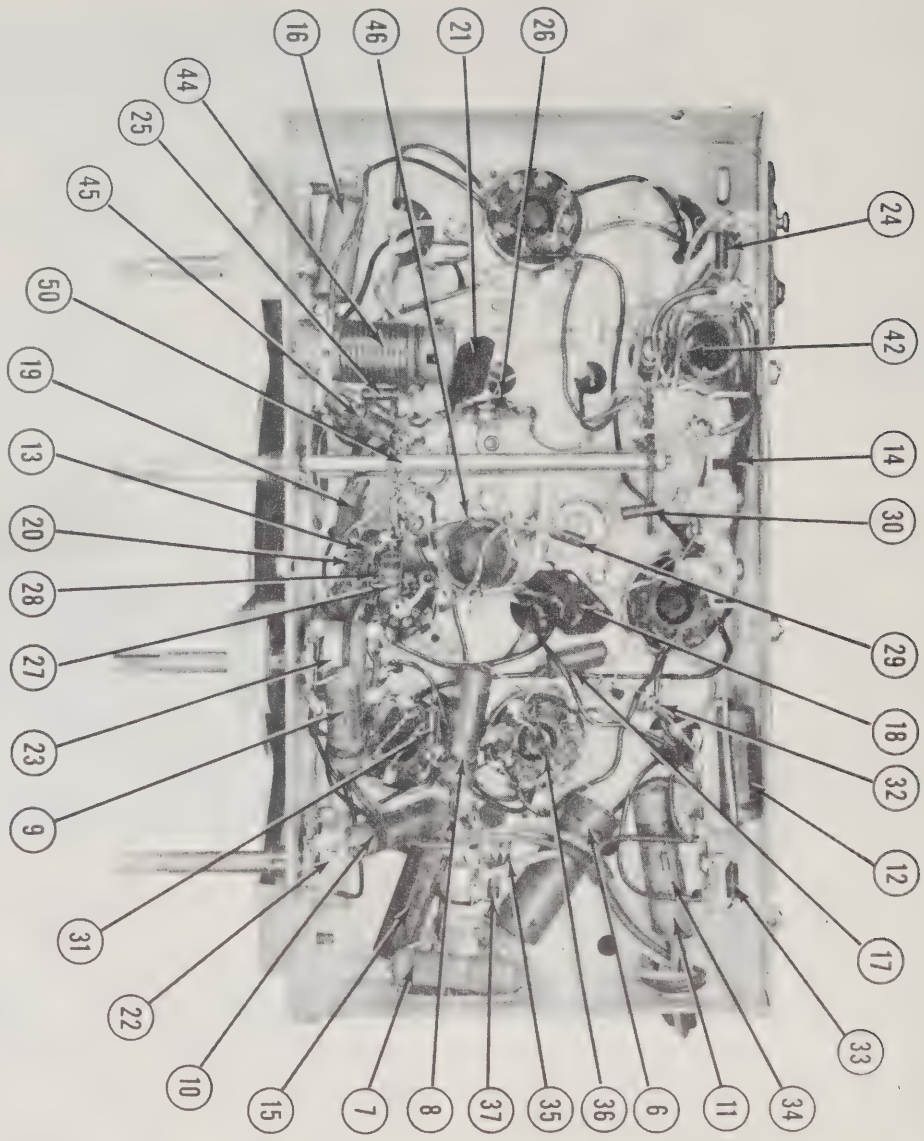
ITEM No.	VOLTAGE	DETROLA PART No.	REPLACEMENT DATA: EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
49	1.5V"A" 90V "B"				#758			17GD60	

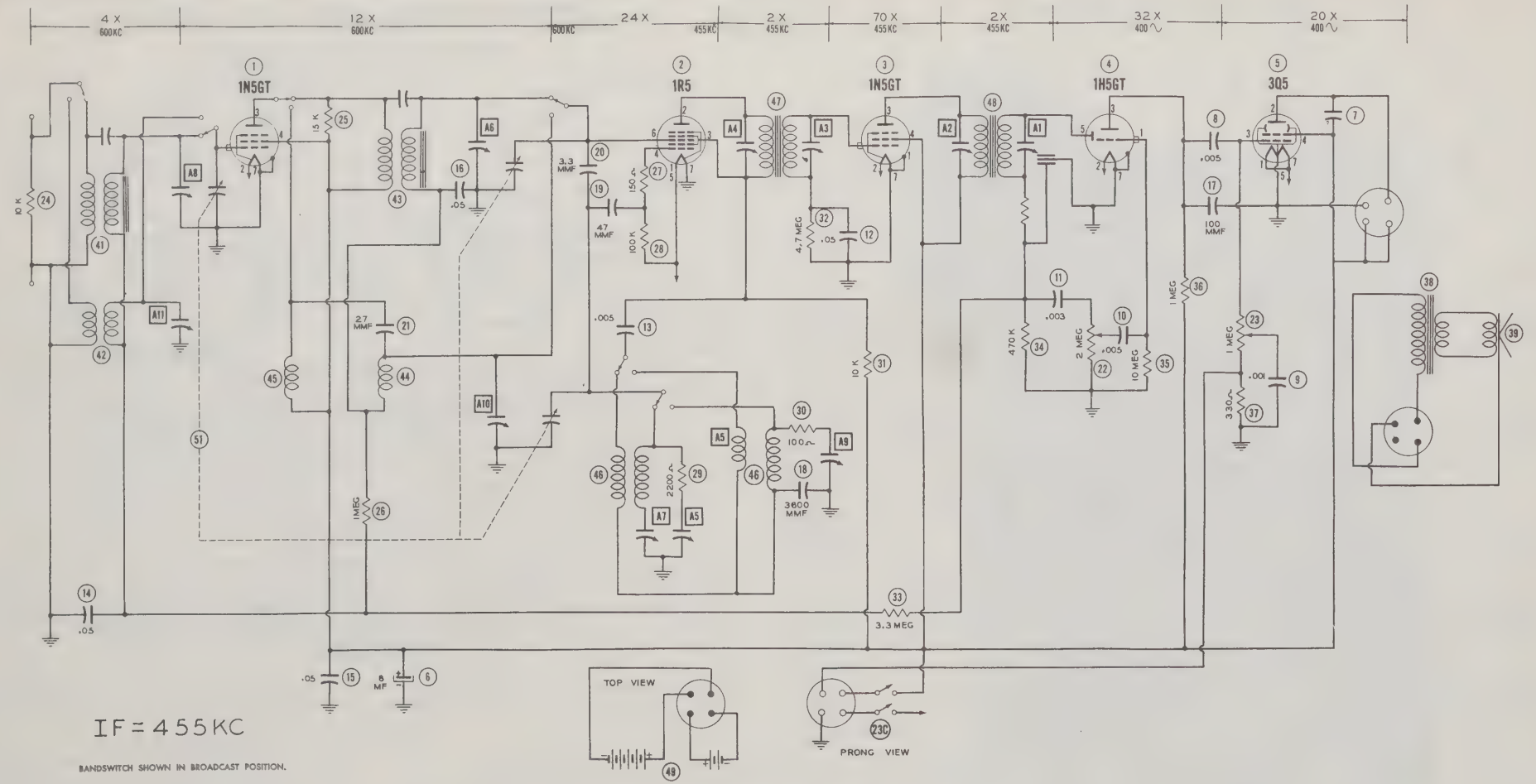
MISCELLANEOUS

ITEM No.	PART NAME	DETROLA PART No.	NOTES
50	Band Switch	B-51270-1	
51	Tuning Capacitor	C-54498-1	(12-435MMF) each section
	Trimmer Assby.	A-51294	A6, A8, A10
A7	Trimmer Cap.	B-55066-1	BC Osc. Padder



CHASSIS—BOTTOM VIEW





VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	1N5GT	0V.	1.5VDC	87VDC	87VDC	0V.	0V.	0V.	0V.	0V.
2	1R5	0V.	55VDC	55VDC	-5.2VDC§	0V.	0V.	1.5VDC	-	-
3	1N5GT	0V.	1.5VDC	87VDC	87VDC	0V.	0V.	0V.	0V.	0V.
4	1H5GT	0V.	1.5VDC	57VDC	0V.	0V.	0V.	0V.	87VDC	0V.
5	3Q5GT	0V.	1.5VDC	80VDC	87VDC	-.5VDC	80VDC	1.5VDC	0V.	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	1N5GT	0Ω	*	170KΩ	170KΩ	INF.	INF.	0Ω	INF.	4.3 Meg.
2	1R5	0Ω	180KΩ	180KΩ	90KΩ	0Ω	5 Meg.	*	-	-
3	1N5GT	0Ω	*	170KΩ	170KΩ	INF.	INF.	0Ω	INF.	4.5 Meg.
4	1H5GT	0Ω	*	1.2 Meg.	INF.	540KΩ	INF.	0Ω	170KΩ	10 Meg.
5	3Q5GT	0Ω	*	170KΩ	170KΩ	370KΩ	170KΩ	*	0Ω	-

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4820-6

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting to chassis.

1 - DC Voltage measurements are at 20,000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5 - Volume control at maximum, no signal applied for voltage measurements.

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Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

GAROD

900, 1000, 1100, 1200 SERIES

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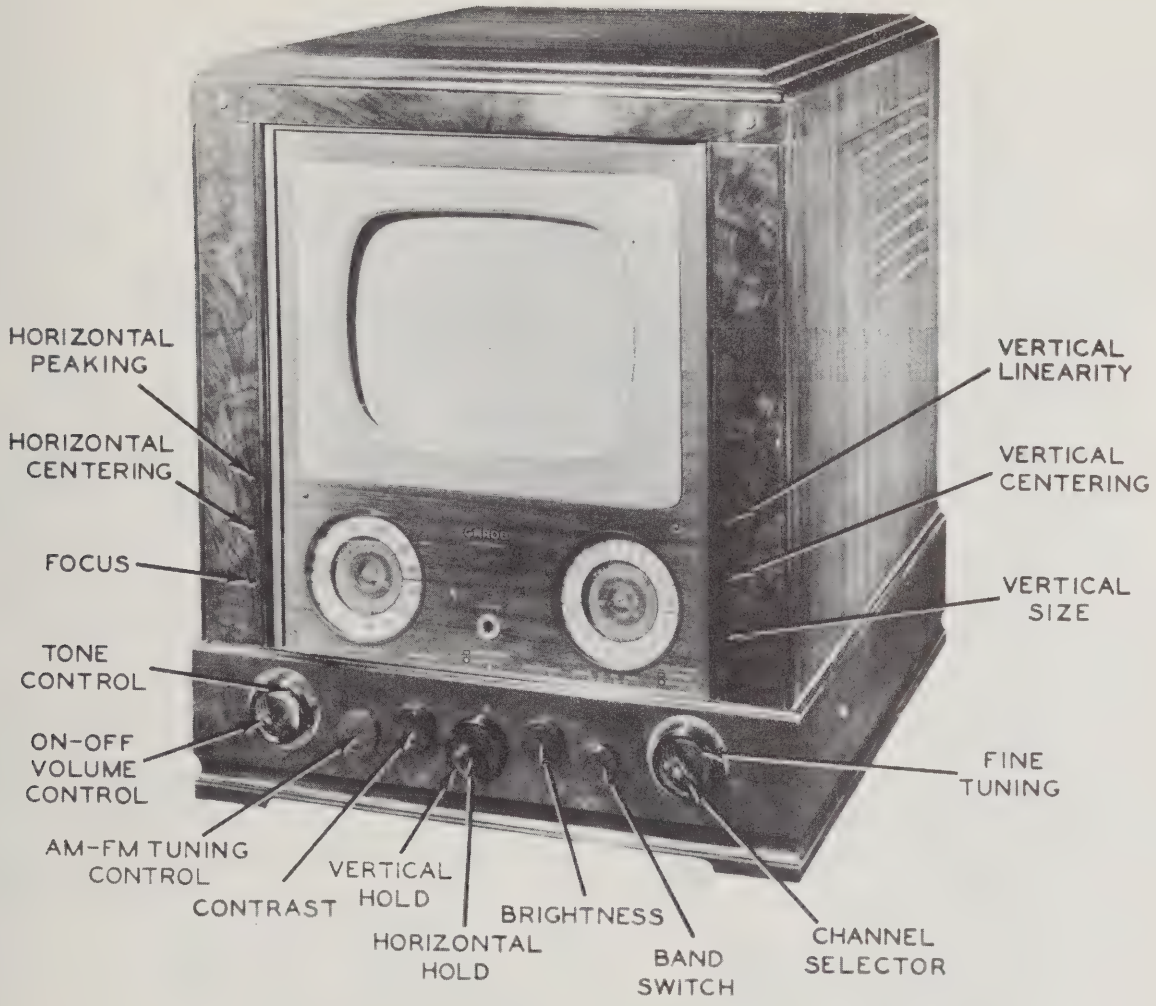
Date 11/48—No. 4820-7 **Set No. 50—Folder No. 7**



GAROD MODEL 900TV

TRADE NAME	Garod, Models 900TV, 910TV, 1000TV, 1010TV, 1100TVP, 1110TVP, 1200TVP, 1210TVP
MANUFACTURER	Garod Radio Corp., 70 Washington St., Brooklyn 1, N.Y.
TYPE SET	AM-FM Television Receiver
TUBES	Twenty-Eight
POWER SUPPLY	105-125 Volts AC RATING 2.38 Amps. @ 117V AC
TUNING RANGE—	AM 540-1650KC, FM 88-108MC, TELEVISION Channels 1 thru 13

TABLE OF CONTENTS

	Page		Page
Complete Schematic	2	Rear Panel Adjustments	12
Chassis Bottom View-Capacitor Identification	3	Dial Stringing	12
Chassis Bottom View-Transformer, Inductor and Alignment Identification	4	Tube Placement Chart	14
Parts List	5,8,13	Voltage and Resistance Measurements	15
Alignment Instructions	6,7	Block Diagram	16
RF Tuner-Left Side	9	RF Tuner-Right Side	17
Chassis Bottom View-Resistor Identification	10	Chassis Top View-Right Side	18
Chassis Top View-Left Side	11	Disassembly Instructions	19

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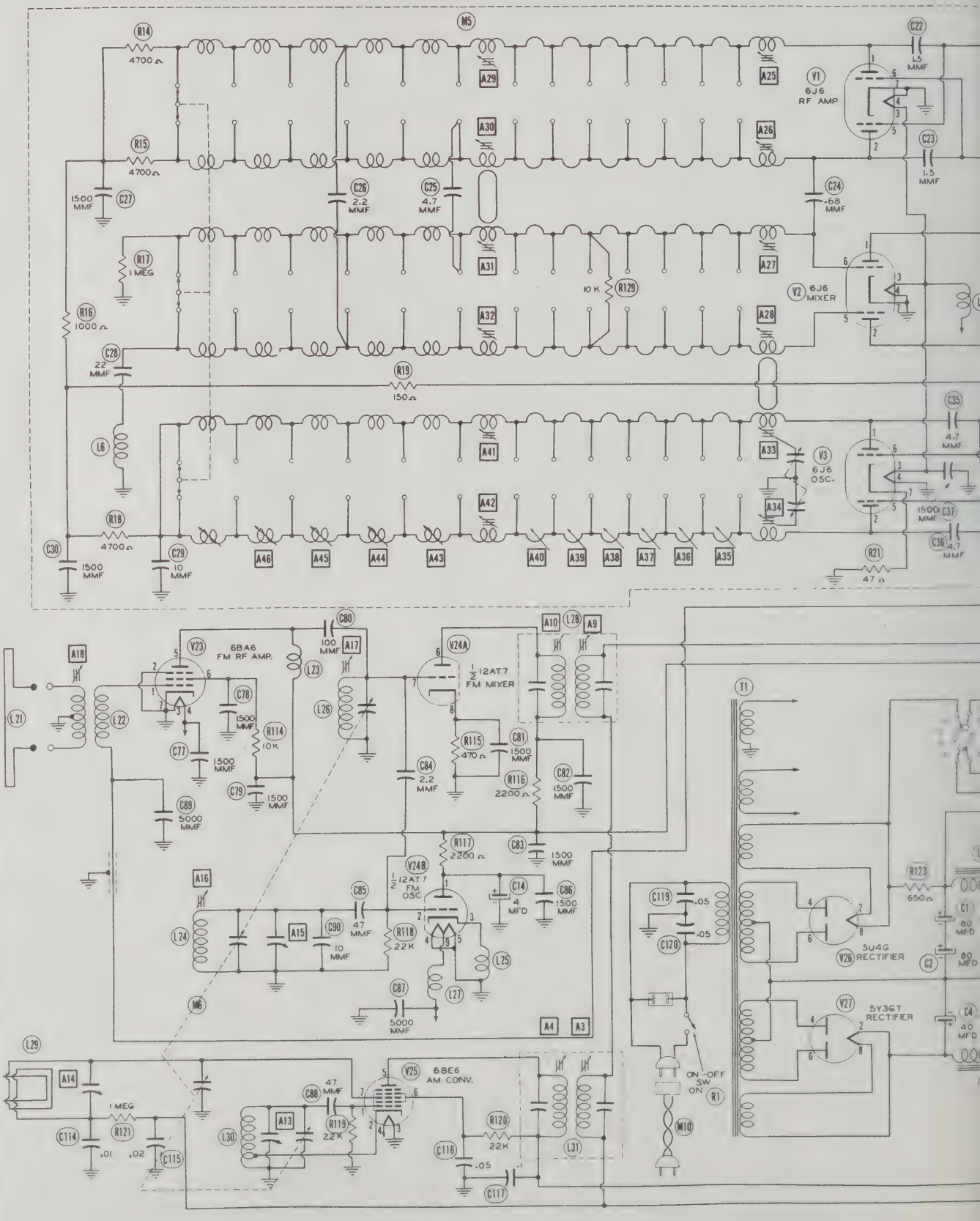
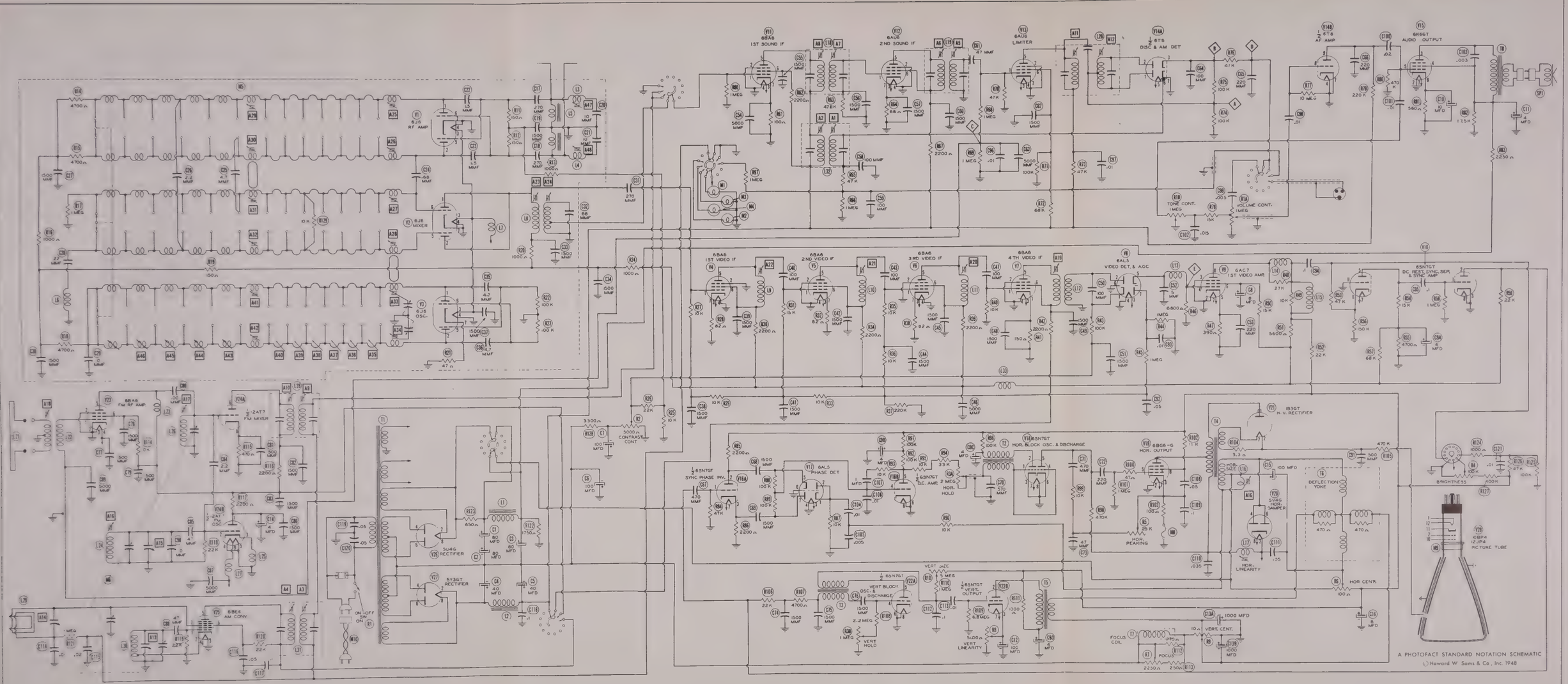
DATE 11/48-#4820-7 SET #50-FOLDER #7

GAROD 900, 1000,
1100, 1200 SERIES


R14 4700Ω
R15 4700Ω
C27 1500 MMF
C26 2.2 MMF
C25 4.7 MMF
R17 1 MEG
R16 1000Ω
C28 22 MMF
R19 150Ω
L6
R18 4700Ω
C30 1500 MMF
C29 10 MMF
M5
A29
A30
A31
A32
A41
A42
A46
A45
A44
A43
A40
A39
A38
A37
A36
A35
A25
A26
A27
A28
A33
A34
V1 6J6 RF AMP
V2 6J6 MIXER
V3 6J6 OSC.
C22 1.5 MMF
C23 1.5 MMF
C24 .68 MMF
R129 10 K
C35 4.7 MMF
C31 1500 MMF
C36 4.7 MMF
R21 47Ω
A18
L21
L22
V23 6BA6 FM RF AMP.
C80 100 MMF
A17
L23
L26
C78 1500 MMF
R114 10K
C77 1500 MMF
C79 1500 MMF
C89 5000 MMF
V24A ½ 12AT7 FM MIXER
A10
L28
A9
R115 470Ω
C81 1500 MMF
C84 2.2 MMF
R116 2200Ω
C82 1500 MMF
R117 2200Ω
C83 1500 MMF
V24B ½ 12AT7 FM OSC.
A16
C85 47 MMF
C14 4 MFD
C86 1500 MMF
L24
A15
C90 10 MMF
R118 22K
L25
L27
C87 5000 MMF
M6
A4
A3
T1
R123 650Ω
C1 80 MFD
C2 80 MFD
C4 40 MFD
V26 5U4G RECTIFIER
V27 5Y3GT RECTIFIER
C119 .05
C120 .05
ON-OFF SW
R1
M10
L29
A14
1 MEG
C114 .01
.02
C115
R121
L30
A13
C88 47 MMF
R119 22K
V25 6BE6 AM CONV.
R120 22K
C116 .05
C117
L31


GAROD 900, 1000, 1100, 1200 SERIES
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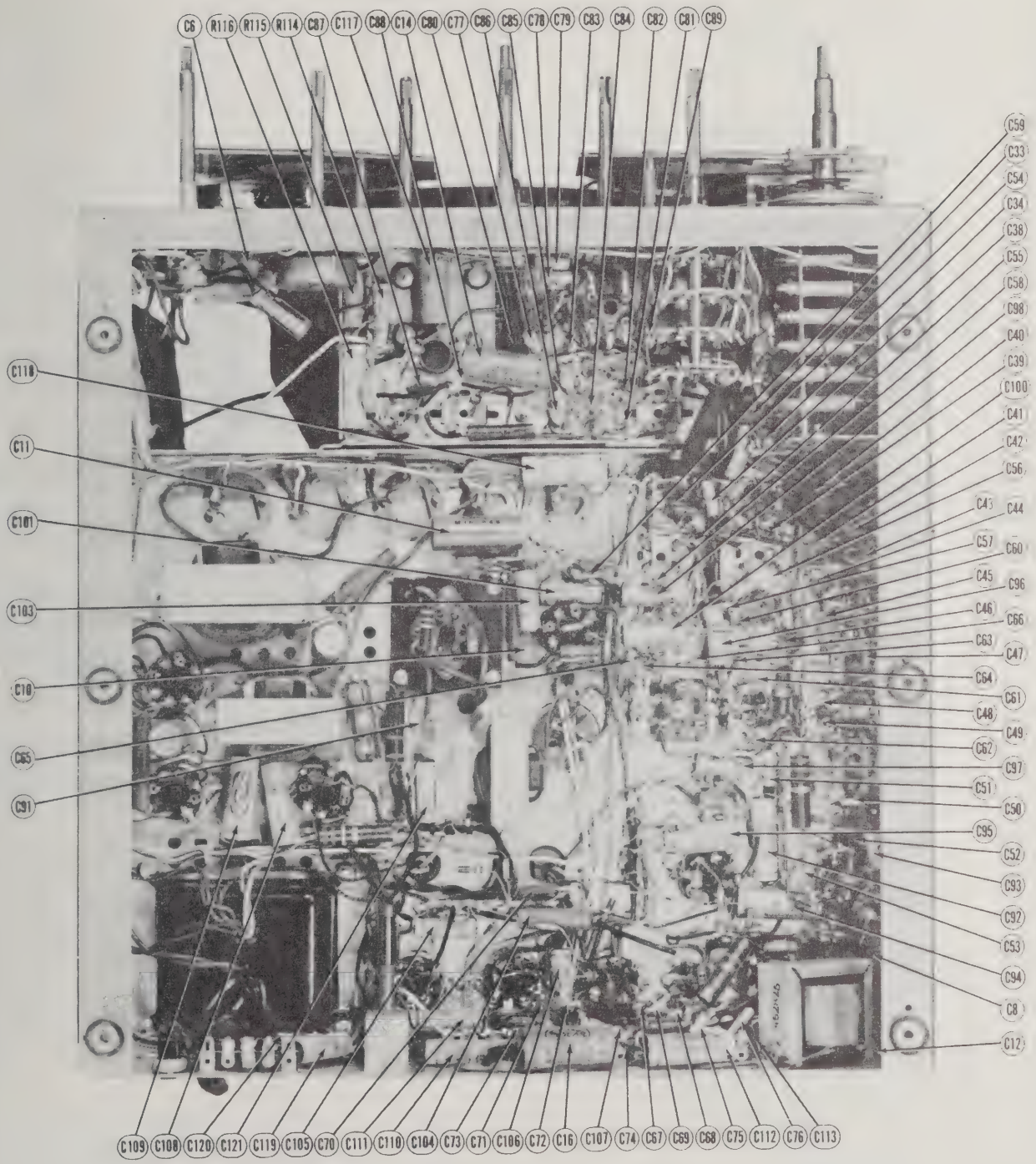
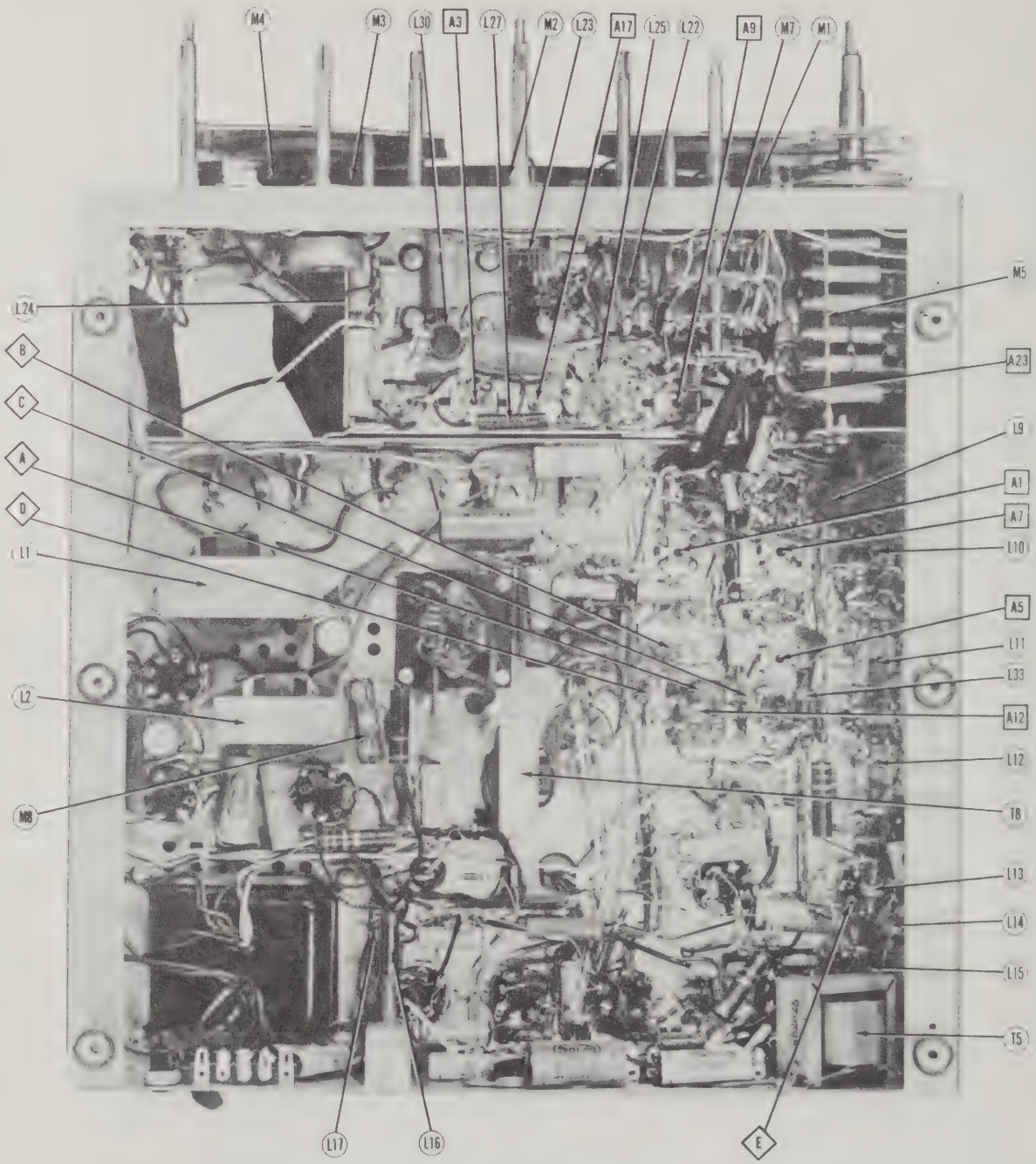


CHASSIS BOTTOM VIEW–CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-TRANSFORMER INDUCTOR AND ALIGNMENT IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	REPLACEMENT DATA: GAROD PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amplifier	6J6	6J6	7BF	
V2	Mixer	6J6	6J6	7BF	
V3	Oscillator	6J6	6J6	7BF	
V4	1st Video IF Amp.	6BA6	6BA6	7BK	
V5	2nd " " "	6BA6	6BA6	7BK	
V6	3rd " " "	6BA6	6BA6	7BK	
V7	4th " " "	6BA6	6BA6	7BK	
V8	Video Det. & AGC	6AL5	6AL5	6PT	
V9	1st Video Amp.	6AC7	6AC7		
V10	DC Rest., Sync. Sep. & Sync. Amp.	6SN7GT	6SN7GT	8BD	
V11	1st Sound IF Amp.	6BA6	6BA6	7BK	
V12	2nd " " "	6AU6	6AU6	7BK	
V13	Limiter	6AU6	6AU6	7BK	
V14	Disc., AM Det. & AF Amp.	6T8	6T8	9E	
V15	Audio Output	6K6GT	6K6GT	7S	
V16	Phase Inv. & DC Amp.	6SN7GT	6SN7GT	8BD	
V17	Phase Det.	6AL5	6AL5	6PT	
V18	Hor. Blocking Osc. & Discharge	6SN7GT	6SN7GT	8PD	
V19	Hor. Output	6BG6-G	6BG6-G	5BT	
V20	Hor. Damper	5V4-G	5V4-G	5L	
V21	High Voltage Rect.	1B3GT	1B3GT	3C	
V22	Vert. Blocking Osc. & Output	6SN7GT	6SN7GT	8BD	
V23	FM RF Amp.	6BA6	6BA6	7BK	
V24	FM Conv.	12AT7	12AT7	9A	
V25	AM Conv.	6BE6	6BE6	7CH	
V26	Low Voltage Rect.	5U4G	5U4G	5T	
V27	"	5Y3GT	5Y3GT	5T	
V28A	Picture Tube	10BP4	10BP4		Used in 900 & 1100 Series
B	" "	12JP4	12JP4		Used in 1000 & 1200 Series

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: GAROD PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1	80	350	C-5.421-3	AF88J	UP8045			Filter
C2	80	350	C-5.421-3	AF88J	UP8045			"
C3	80	500	C-5.421-2		UP8050			"
C4	40	450	C-5.400-9	AF8J	UP4045			"
C5	40	450	C-5.400-9	AF8J	UP4045			
C6	100	50	C-5.420-2	PRS50-100	BRH501	M-100-50	UHC-105	Bias Filter
C7	100	25	C-5.420-1	PRS25-100	BRH251	M-100-25	UHC-102	" "
C8	8	450	C-5.428	PRS450-8	BR845	M-8-450	UT-8	V. Amp. Screen Bypass
C9A	4	450	C-5.421-1	AF2222J	UP111145			DC Res. Plate Decoup.
B	4	450						DC Amp. Plate Decoup.
C	4	450						Hor. Osc. Decoup.
D	4	450						Vert. Out. Plate Decoup.
C10	10	25	B-5.413	PRS25-10	BR102A	M-10-25	TA-10	Audio Output Cathode
C11	4	450	B-5.418	PRS450-4	BR445	M-4-450	UT-4	Audio Output Decoup.
C12	100	25	C-5.420-1	PRS25-100	BRH251	M-100-25	UHC-102	Vert. Output Cathode
C13A	1000	6	C-5.422					Vert. Cent. Cont. Byp.
B	1000	6						" " "
C14	4	450	B-5.418	PRS450-4	BR445	M-4-450	UT-4	FM Osc. Plate Byp.
C15	100	25	C-5.420-1	PRS25-100	BRH251	M-100-25	UHC-102	Hor. Cent. Cont. Byp.
C16	8	450	C-5.428	PRS450-8	BR845	M-8-450	UT-8	Decoupling Filter
C17	270	*						Ant. Coupling -Cer.
C18	270							" " "
C19	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	RF Bypass "
C20	10		C-4.109-16					Fixed Trimmer "
C21	10		C-4.109-16					" " "
C22	1.5							RF Neutralizer "

CAPACITORS (CONT.)

C109	.1	400	D-3.100-23	484-1	DT4P1	ST-4-1	TM-1	Hor. Output Cath. Byp.
C110	.035	600	D-3.100-46					Damper Filter
C111	.05	600	D-3.100-20	684-05	DT6S5	ST-6-05	TM-15	" "
C112	.1	400	D-3.100-23	484-.1	DT4P1	ST-4-1	TM-1	Vert. Discharge
C113	.01	400	D-3.100-7	484-01	DT4S1	ST-4-01	TM-11	Vert. Coupling
C114	.01	400	D-3.100-7	484-01	DT4S1	ST-4-01	TM-11	AVC Filter
C115	.02	200	D-3.100-10	484-02	DT4S2	ST-4-02	TM-12	" "
C116	.05	400	D-3.100-19	484-05	DT4S5	ST-4-05	TM-15	AM Conv. Screen Bypass
C117	.1	400	D-3.100-23	484-.1	DT4P1	ST-4-1	TM-1	RF Bypass
C118	.1	400	D-3.100-23	484-.1	DT4P1	ST-4-1	TM-1	" "
C119	.05	400	D-3.100-19	484-05	DT4S5	ST-4-05	TM-15	Line Filter
C120	.05	400	D-3.100-19	484-05	DT4S5	ST-4-05	TM-15	" "
C121	.01	400	D-3.100-7	484-01	DT4S1	ST-4-01	TM-11	ACC. Anode Bypass

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: GAROD PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R1A	1 Meg.	½	C-8.218			Tone Control-Front Section
B	1 Meg.	½				Volume Control-Tapped @ 500KΩ
C	Switch					Power Switch-SPST
R2A	500Ω	½	C-8.219-3	AM-19-S	D11-114	Contrast Control
B	Shaft			KSS-3	E	Attach to R2A per instructions
R3A	2 Meg.	½	C-8.217			Vert. Hold-Front Section
B	1 Meg.	½				Hor. Hold-Rear Section
R4A	100KΩ	2	C-8.219-2	AM-40-S	D11-128	Brightness Control
B	Shaft			KSS-3	E	Attach to R4A per instructions
R5A	25KΩ	2	C-8.219-4	M-40-S	D11-120	Horizontal Peaking-See Note 1
B	Shaft			Not Req.	A	Attach to R5A per instructions
R6	100Ω		C-8.220-2	43-100	W-100	Horizontal Centering
R7	2250Ω		C-8.221	43-2000		Focus Control
R8	5KΩ		C-8.206-1	43-5000	W-5000	Vertical Linearity
R9	10Ω		C-8.220-1		W-10X5	Vertical Centering-Tapped @ 5Ω
R10A	2 Meg.		C-8.219-1		D11-141	Vertical Size
B	Shaft				A	Attach to 10A per instructions-See Note 1

Note 1-Cut and file shaft of the replacement control to duplicate that of the original control.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: GAROD PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES		
R11	150Ω	½			Br.-Grn.-Br.	RF Grid Load	
R12	150Ω	½			Br.-Grn.-Br.	RF Grid Load	
R13	1000Ω	½		BTS-1000	Br.-Blk.-Red	Bias Network	
R14	4700Ω	½	D-7.101-45	BTS-4700	Yl.-Vi.-Red	RF Amp. Plate	
R15	4700Ω	½	D-7.101-45	BTS-4700	Yl.-Vi.-Red	" " "	
R16	1000Ω	½		BTS-1000	Br.-Blk.-Red	RF Amp. Plate Decoupling	
R17	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn.	Conv. Grid	
R18	4700Ω	½	D-7.101-45	BTS-4700	Yl.-Vi.-Red	Osc. Plate	
R19	150Ω	½			Br.-Grn.-Br.	Decoupling	
R20	1000Ω	½		BTS-1000	Br.-Blk.-Red	Conv. Plate Decoupling	
R21	47Ω	½			Yl.-Vi.-Blk.	Osc. Cathode	
R22	100KΩ	½	D-7.101-101	BTS-100K	Br.-Blk.-Yl.	Osc. Grid	
R23	100KΩ	½	D-7.101-101	BTS-100K	Br.-Blk.-Yl.	" "	
R24	1000Ω	1	D-7.102-24	BTA-1000	Br.-Blk.-Red	Decoupling	
R25	10KΩ	½	D-7.101-59	BTS-10K	Br.-Blk.-Or.	Bias Network	
R26	22KΩ	½	D-7.100-73	BTS-22K	Red-Red-Or.	" "	
R27	10KΩ	½	D-7.101-59	BTS-10K	Br.-Blk.-Or.	1st Video IF Grid	
R28	82Ω	½	D-7.101-235		Gray-Red-Blk.	1st Video IF Cathode	± 10%
R29	10KΩ	½	D-7.101-59	BTS-10K	Br.-Blk.-Or.	AGC Network	
R30	2200Ω	½	D-7.101-31	BTS-2200	Red-Red-Red	1st Video IF Decoupling	
R31	15KΩ	½	D-7.101-66	BTS-15K	Br.-Grn.-Or.	2nd Video IF Grid	
R32	82Ω	½	D-7.101-235		Gray-Red-Blk.	2nd Video IF Cathode	± 10%
R33	10KΩ	½	D-7.101-59	BTS-10K	Br.-Blk.-Or.	AGC Network	
R34	2200Ω	½	D-7.101-31	BTS-2200	Red-Red-Red	2nd Video IF Decoupling	
R35	10KΩ	½	D-7.101-59	BTS-10K	Br.-Blk.-Or.	3rd Video IF Grid	
R36	10KΩ	½	D-7.101-59	BTS-10K	Br.-Blk.-Or.	AGC Network	
R37	220KΩ	½	D-7.100-115	BTS-220K	Red-Red-Yl.	" " -See Note 1	
R38	82Ω	½	D-7.101-235		Gray-Red-Blk.	3rd Video IF Cathode	± 10%
R39	2200Ω	½	D-7.101-31	BTS-2200	Red-Red-Red	3rd Video IF Decoupling	
R40	10KΩ	½	D-7.101-59	BTS-10K	Br.-Blk.-Or.	4th Video IF Grid	
R41	150Ω	½			Br.-Grn.-Br.	4th Video IF Cathode-See Note 2	
R42	2200Ω	½	D-7.101-31	BTS-2200	Red-Red-Red	4th Video IF Decoupling	

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Remove horizontal oscillator tube (V18) to disable high voltage.

To set pointer turn tuning capacitor fully closed and set pointer in a horizontal position. Connect output meter across the voice coil and leave connected until all steps of the broadcast alignment are completed. When using the output meter the volume control should be at maximum and the output of the signal generator should be kept as low as possible.

Use insulated alignment screwdriver for adjusting.

Waveforms shown may be inverted depending on the number of amplifier stages used in the oscilloscope.

AM IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin #1 of 6BE6 (V25). Low side to chassis.	455KC (Modulated)	AM	1650KC	Across voice coil	A1,A2, A3,A4	Adjust for maximum output at voice coil.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	BAND SWITCH	CONNECT SCOPE	ADJUST	REMARKS
2	.01 MFD	High side to Pin #7 (grid) of 12AT7. Low side to chassis near tube socket.	21.25MC 1 MC sweep	21.25MC	FM	Vertical input to Point A. Ground to chassis.	A5,A6, A7,A8, A9,A10	Adjust for symmetrical pattern of maximum amplitude with marker at peak. See Fig. 1.
3	.01 MFD	"	"	"	"	Vertical input to Point A. Ground to chassis.	A11	"
4	.01 MFD	"	"	"	"	Vertical input to Point D. Ground to chassis.	A12	Adjust for "S" curve with marker at zero. Check A11 for maximum straightness of diagonal line. See Fig. 2.

ALTERNATE FM IF ALIGNMENT USING VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
2	.01 MFD	High side to Pin #7 (grid) of 12AT7. Low side to chassis near tube socket.	21.25MC (Unmodulated)	FM	DC probe to Point D. Common to chassis.	A5,A6, A7,A8, A9,A10	Adjust for maximum deflection.
3	.01 MFD	"	"	"	DC probe to Point A. Common to chassis.	A11	"
4	.01 MFD	"	"	"	DC probe to Point B. Common to chassis.	A12	Adjust for zero. This point must be between a positive and a negative peak.

AM & FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
5		Connect to loop of 2 or 3 turns. Radiate signal into receiver loop.	1600KC (Modulated)	AM	1600KC	Across voice coil	A13	Adjust for maximum output. Be sure dial pointer is set properly as shown in prealignment instructions.
6		"	1500KC (Modulated)	"	Tune for maximum output.	"	A14	Adjust for maximum output.
						CONNECT VTVM		
7	2 -150Ω carbon res.	Across FM ant. terminal with 150Ω in series with each lead.	108.5MC (Unmodulated)	FM	Tuning cap. fully open.	DC probe to Point C. Common to chassis	A15	Adjust for maximum deflection.
8	"	"	87.5MC (Unmodulated)	"	Tuning cap. fully closed	"	A16	Adjust for maximum deflection. Repeat Steps 7 & 8 until no further improvement is noted.
9	"	"	98MC (Unmodulated)	"	Tune to signal.	"	A17, A18	Adjust for maximum deflection.

VIDEO IF ALIGNMENT USING VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10	Direct	High side to either side of R129. Low side to chassis.	24.2MC	8	Across 680Ω resistor in grid of 6AC7, Point E.	A19	Adjust for maximum deflection.
11	Direct	"	22.6MC	8	"	A20	"
12	Direct	"	25.6MC	8	"	A21	"
13	Direct	"	26.6MC	8	"	A22	"
14	Direct	"	22.6MC	8	"	A23	"
15	Direct	"	21.25MC	8	"	A24	Adjust for minimum deflection. Use frequency identical to that used for FM IF Alignment.

VIDEO IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

If signal generator having 10MC FM sweep and oscilloscope are available, the visual check in Step 16 should be performed. Otherwise continue with Step 31. Do not attempt RF Alignment without sweep signal generator and oscilloscope.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16	5000MMF.	High side to Pin #1 of 1st Sound IF Amp. (V11). Low side to chassis.	24MC 6MC sweep	See Fig.3	8	Vertical input to Point E. Ground to chassis.	A19,A20 A21,A22 A23	Adjust for pattern as shown in Fig. 3. The 25.75MC marker should set half-way up the slope as shown. Only slight adjustment of any slug should be necessary.

TV RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
17	150Ω in series with each lead.	TV antenna terminals.	177MC 10MC sweep	175.25 179.75 Connect loosely to either antenna terminal.	7	Vertical input to Point ⊕ in series with 10KΩ.(Accessible through hole in side of chassis.) Ground to chassis.	A25,A26 A27,A28	Waveform should be approximately as shown in Fig. 4. Markers should be at more than 70% of peak amplitude and dip in center should not exceed 30%.
18	"	"	183MC 10MC sweep	181.25 185.75	8	"	"	Check for markers at greater than 70%, and not more than 30% dip in center. Make slight readjustments of A25,A26,A27 & A28 if necessary.
19	"	"	189MC 10MC sweep	187.25 191.75	9	"	"	"
20	"	"	195MC 10MC sweep	193.25 197.75	10	"	"	"
21	"	"	201MC 10MC sweep	199.25 203.75	11	"	"	"
22	"	"	207MC 10MC sweep	205.25 209.75	12	"	"	"
23	"	"	213MC 10MC sweep	211.25 215.75	13	"	"	"
24								Recheck Steps 17 to 23 and make slight adjustments if necessary.
25	150Ω in series with each side	TV antenna terminals.	85MC 10MC sweep	83.25MC 87.75MC	6	Vertical input to Point ⊕ in series with 10KΩ.(Accessible through hole in side of chassis.) Ground to chassis.	A29,A30 A31,A32	Waveform should be approximately as shown in Fig. 4. Markers should be at more than 70% of peak amplitude and dip in center should not exceed 30%.
26	"	"	79MC 10MC sweep	77.25MC 81.75MC	5	"	"	Check for markers at generator than 70%, and not more than 30% dip in center. Make slight readjustments of A29,A30,A31 and A32 if necessary.
27	"	"	69MC 10MC sweep	67.25MC 71.75MC	4	"	"	"
28	"	"	63MC 10MC sweep	61.25MC 65.75MC	3	"	"	"
29	"	"	57MC 10MC sweep	55.25MC 59.75MC	2	"	"	"
30								Recheck Steps 25 to 29 and make slight adjustments if necessary.

TV OSCILLATOR ALIGNMENT

Set fine tuning control to a position approximately 140° from its full counter-clockwise position. This aligns the holes in the drive disc with the adjustment screws on the oscillator switch wafer. Do not change this setting during entire oscillator alignment.

All oscillator adjustment points except A33, A34, A41 and A42 are found directly behind the large hole in the bandswitch dial string drum. Insert screwdriver through this hole to make adjustments.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
31	150Ω in series with each lead	TV antenna terminals	215.75	13	DC probe to Point ⊖.Common to chassis.	A33 or A34	Adjust for maximum deflection. Signal generator frequency must be set very accurately.
32	"	"	209.75	12	"	A35	"
33	"	"	203.75	11	"	A36	"
34	"	"	197.75	10	"	A37	"
35	"	"	191.75	9	"	A38	"
36	"	"	185.75	8	"	A39	"
37	"	"	179.75	7	"	A40	"
38	"	"	87.75	6	"	A41 or A42	"
39	"	"	81.75	5	"	A43	"
40	"	"	71.75	4	"	A44	"
41	"	"	65.75	3	"	A45	"
42	"	"	59.75	2	"	A46	"

WAVE TRAP ADJUSTMENT

Wave traps A47 and A48 are used for specific types of interference, and their alignment will depend on the type interference encountered.

With the receiver tuned to the channel being interfered with, A47 and A48 should be adjusted for minimum interference. The two slugs should be set in approximately the same position.

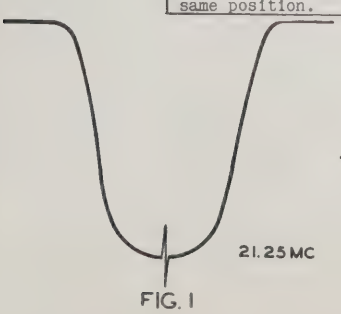


FIG. 1

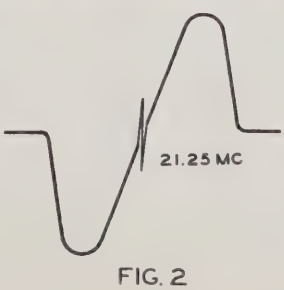


FIG. 2

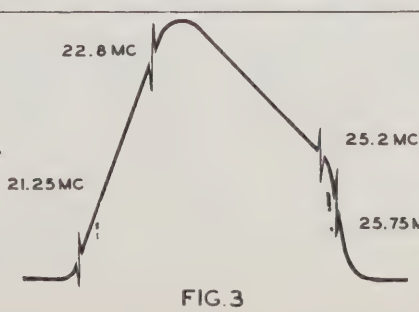


FIG. 3

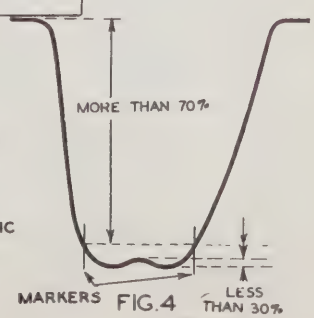
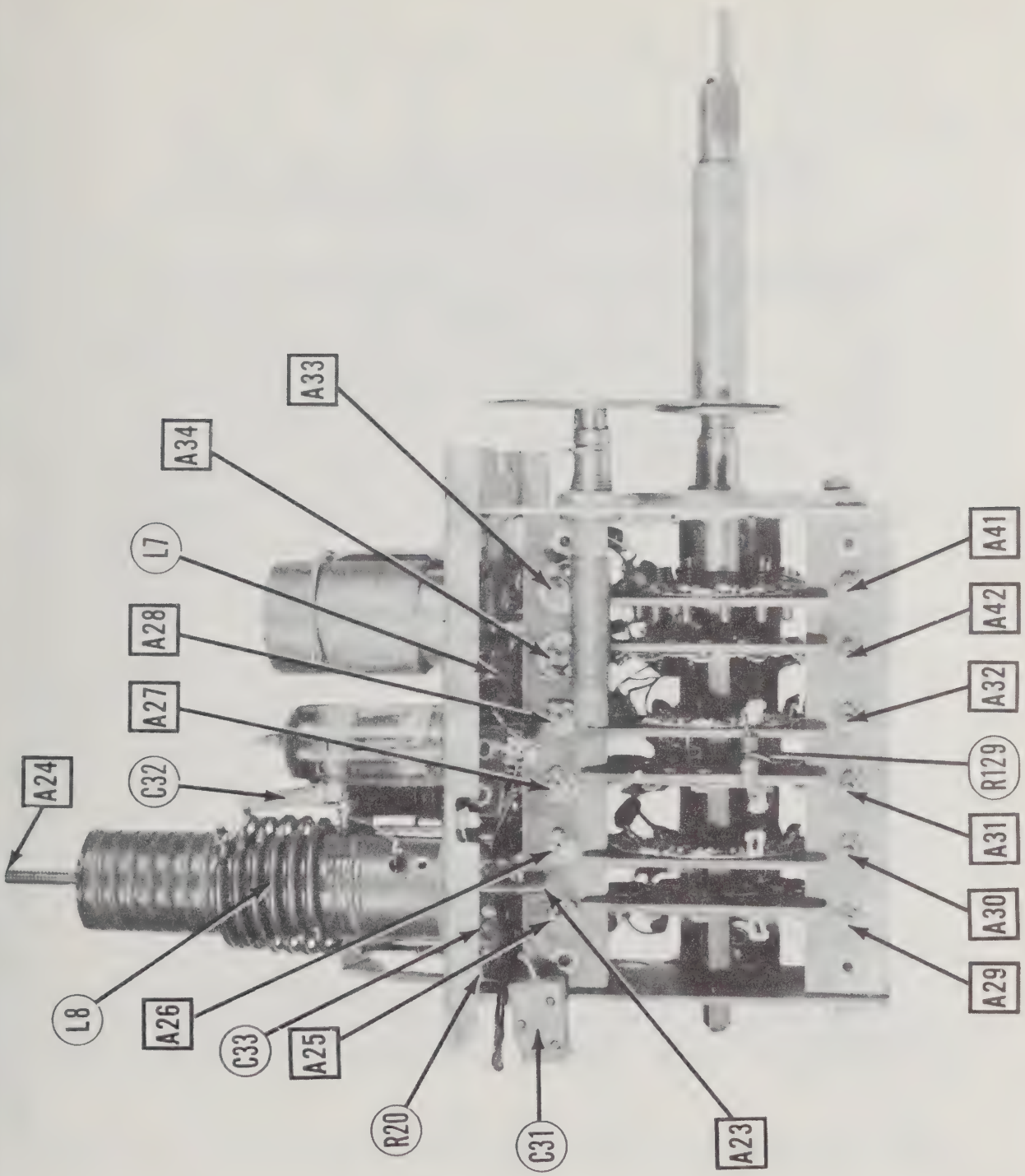


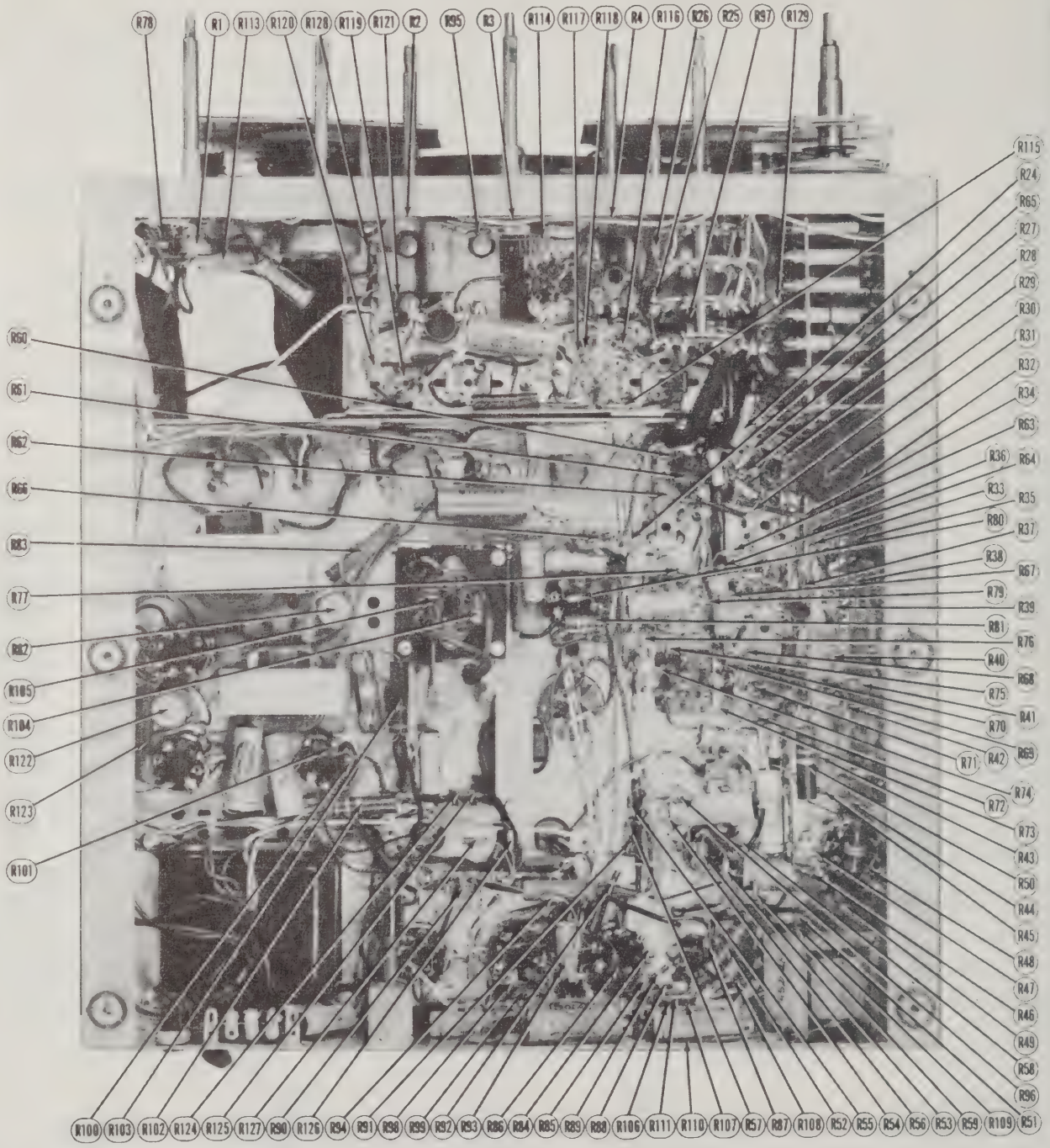
FIG. 4

C23	1.5							" " "	R43	100KΩ	±	D-7.101-101	BTS-100K	Br.-Blk.-Yl.	Bias Network	± 10%
C24	.56							" " "	R44	1 Meg.	±	D-7.100-143	BTS-1 Meg.	Br.-Blk.-Grn.	AGC Load	
C25	4.7		4.111-6					RF Coupling "	R45	1 Meg.	±	D-7.100-143	BTS-1 Meg.	Br.-Blk.-Grn.	AGC Network	
C26	2.2							" " "	R46	68Ω	±	D-7.100-51	BTS-6800	Blue-Gray-Red	Video Amp. Grid	± 10%
C27	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	RF Decoupling "	R47	330Ω	±	D-7.100-211		Or.-White-Br.	Video Amp. Cathode	± 10%
C28	22							RF Bypass "	R48	27KΩ	±	D-7.100-76	BTS-27K	Red-Vi.-Or.	Video Amp. Plate	± 10%
C29	10		C-4.109.16	1468-00001	5W5Q1		MS-41	RF Decoupling "	R49	10KΩ	±	D-7.101-59	BTS-10K	Br.-Blk.-Or.	" " "	"
C30	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	" " "	R50	15KΩ	2		BT-2-15K	Br.-Grn.-Or.	Video Amp. Screen Load	
C31	270							IF Coupling "	R51	5600Ω	1		BTA-5600	Grn.-Blue-Red	Voltage Divider Network	± 10%
C32	68							Fixed Trimmer "	R52	22KΩ	2		BT-2-22K	Red-Red-Or.	Voltage Divider Network	
C33	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	Mixer Decoupling "	R53	47KΩ	±	D-7.100-87	BTS-47K	Yl.-Vi.-Or.	Picture Tube Grid	
C34	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	" " "	R54	15KΩ	±	D-7.101-66	BTS-15K	Br.-Grn.-Or.	DC Restorer Plate	
C35	4.7		4.111-6					Osc. Feedback "	R55	4700Ω	±	D-7.101-45	BTS-4700	Yl.-Vi.-Red	Voltage Divider Network	
C36	4.7		4.111-6					" " "	R56	150KΩ	±	D-7.100-108	BTS-150K	Br.-Grn.-Yl.	DC Restorer Cathode	
C37	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	Fil. Bypass "	R57	68KΩ	±	D-7.101-94	BTS-68K	Blue-Gray-Or.	Voltage Divider Network	
C38	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	AGC Filter "	R58	1 Meg.	±	D-7.100-143	BTS-1 Meg.	Br.-Blk.-Grn.	Sync. Amp. Grid Load	
C39	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	1st V. IF Decoup. "	R59	22KΩ	±	D-7.100-73	BTS-22K	Red-Red-Or.	Sync. Amp. Plate Load	
C40	100		C-4.109-10	1468-0001	5W5T1	MO.5-31	1FM-31	Video IF Coupling "	R60	1 Meg.	±	D-7.100-143	BTS-1 Meg.	Br.-Blk.-Grn.	1st Sound Amp. Grid Load	
C41	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	AGC Filter "	R61	100Ω	±	D-7.101-226		Br.-Blk.-Br.	1st Sound Amp. Cathode	
C42	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	2nd V. IF Decoup. "	R62	2200Ω	±	D-7.101-31	BTS-2200	Red-Red-Red	1st Sound Amp. Screen Load	
C43	100		C-4.109-10	1468-0001	5W5T1	MO.5-31	1FM-31	Video IF Coupling "	R63	470KΩ	±	D-7.100-129	BTS-470K	Yl.-Vi.-Yl.	2nd Sound Amp. Grid Load	
C44	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	AGC Filter "	R64	68Ω	±	D-7.100-199		Blue-Gray-Blk.	2nd Sound Amp. Cathode	
C45	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	3rd V. IF Decoup. "	R65	47KΩ	±	D-7.100-87	BTS-47K	Yl.-Vi.-Or.	AM Det. RF Filter	
C46	5000		B-4.115-1	1467-005	1D5D5	MW.5-25	1FM-25	RF Bypass "	R66	1 Meg.	±	D-7.100-143	BTS-1 Meg.	Br.-Blk.-Grn.	AM Det. Diode Load	
C47	100		C-4.109-10	1468-0001	5W5T1	MO.5-31	1FM-31	Video Coupling "	R67	2200Ω	±	D-7.101-31	BTS-2200	Red-Red-Red	2nd Sound Amp. Decoupling	
C48	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	4th V. IF Cath. "	R68	1 Meg.	±	D-7.100-143	BTS-1 Meg.	Br.-Blk.-Grn.	FM AVC Network	
C49	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	4th V. IF Decoup. "	R69	1 Meg.	±	D-7.100-143	BTS-1 Meg.	Br.-Blk.-Grn.	" " "	
C50	100		C-4.109-10	1468-0001	5W5T1	MO.5-31	1FM-31	AGC Coupling "	R70	47KΩ	±	D-7.100-87	BTS-47K	Yl.-Vi.-Or.	Limiter Grid Load	
C51	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	RF Bypass "	R71	100KΩ	±	D-7.101-101	BTS-100K	Br.-Blk.-Yl.	Limiter Screen Voltage Divider	
C52	5							Diode Filter "	R72	68KΩ	±	D-7.101-94	BTS-68K	Blue-Gray-Or.	" " " "	
C53	220		C-4.109-11					Video Amp. Cath. "	R73	47KΩ	±	D-7.100-87	BTS-47K	Yl.-Vi.-Or.	Limiter Plate Decoupling	
C54	5000		B-4.115-1	1467-005	1D5D5	MW.5-25	1FM-25	1st IF Cath. Byp. "	R74	100KΩ	±	D-7.101-101	BTS-100K	Br.-Blk.-Yl.	Discriminator Plate Load	
C55	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	1st IF Screen Byp. "	R75	100KΩ	±	D-7.101-101	BTS-100K	Br.-Blk.-Yl.	Discriminator Cathode	
C56	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	2nd IF Grid Filter "	R76	47KΩ	±	D-7.100-87	BTS-47K	Yl.-Vi.-Or.	De-emphasis	
C57	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	2nd IF Cath. Byp. "	R77	10 Meg.	±	D-7.100-185	BTS-10 Meg.	Br.-Blk.-Blue	1st AF Grid	
C58	100		C-4.109-10	1468-0001	5W5T1	MO.5-31	1FM-31	Diode Filter "	R78	15KΩ	±	D-7.101-66	BTS-15K	Br.-Grn.-Or.	Tone Compensation	
C59	100		C-4.109-10	1468-0001	5W5T1	MO.5-31	1FM-31	" " "	R79	220KΩ	±	D-7.100-115	BTS-220K	Red-Red-Yl.	1st AF Amp. Plate Load	
C60	1500		D-4.108-12	1467-0015	1W5T15		1FM-215	2nd IF Decoupling "	R80	470KΩ	±	D-7.100-129	BTS-470K	Yl.-Vi.-Yl.	Power Output Grid Load	
C61	47		C-4.109-12	1468-00005	5W5Q5	MO.5-45	1FM-45	IF Coupling "	R81	560Ω	1	D-7.102-13	BTA-560	Grn.-Blue-Br.	Power Output Cathode	± 10%
C62	1500		D-4.108-12	1467-0015	1W5T15		1FM-215	Limiter Screen "	R82	17.5KΩ	25	B-6.216	DHA-20K		Voltage Divider-See Note 9	± 10%
C63	5000		B-4.115-1	1467-005	5D5D5	MW.5-25	1FM-25	AVC Filter "	R83	2250Ω	7	B-6.215-2	AB-2250		" "	± 10%
C64	100		C-4.109-10	1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass "	R84	47KΩ	±	D-7.100-87	BTS-47K	Yl.-Vi.-Yl.	Phase Inverter Grid	
C65	220		C-4.109-11					De-emphasis "	R85	2200Ω	±	D-7.101-31	BTS-2200	Red-Red-Red	Phase Inverter Plate Load-See Note 3	
C66	220		C-4.109-11					Audio Plate Bypass "	R86	2200Ω	±	D-7.101-31	BTS-2200	Red-Red-Red	Phase Inverter Cathode-See Note 3	
C67	470		C-4.109-2	1468-0005	5W5T5	MO.5-35	1FM-35	Sync. Coupling "	R87	10KΩ	±	D-7.101-59	BTS-10K	Br.-Blk.-Or.	Phase Det. Plate Load	
C68	1500		D-4.108-12					Hor. Sync. Coup. 1% "	R88	100KΩ	±	D-7.101-101	BTS-100K	Br.-Blk.-Yl.	DC Amp. Grid-See Note 4	
C69	1500		D-4.108-12					" " " "	R89	100KΩ	±	D-7.101-101	BTS-100K	Br.-Blk.-Yl.	" " " " " 4	
C70	560	500	D-4.104-21					Hor. Osc. Grid "	R90	10KΩ	±	D-7.101-59	BTS-10K	Br.-Blk.-Or.	Phase Det. Load	
C71	470		C-4.109-2	1468-0005	5W5T5	MO.5-35	1FM-35	Hor. Discharge "	R91	100KΩ	±	D-7.101-101	BTS-100K	Br.-Blk.-Yl.	DC Amp. Decoupling	
C72	220		C-4.109-11					Hor. Sweep Coup. "	R92	100KΩ	±	D-7.101-101	BTS-100K	Br.-Blk.-Yl.	DC Amp. Plate	
C73	47		C-4.109-12	1468-00005	5W5Q5	MO.5-45	1FM-45	Hor. Discharge "	R93	10KΩ	±	D-7.101-59	BTS-10K	Br.-Blk.-Or.	Quadrature Network	
C74	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	Integrator Net. "	R94	33KΩ	±	D-7.100-79	BTS-33K	Or.-Or.-Or.	Horizontal Osc. Grid	
C75	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	" " "	R95	10KΩ	±	D-7.101-59	BTS-10K	Br.-Blk.-Or.	" " "	
C76	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	Vert. Osc. Grid "	R96	100KΩ	±		BTS-100K	Br.-Blk.-Yl.	Hor. Osc. Plate Decoupling	± 5%
C77	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	FM RF Fil. Byp. "	R97	1 Meg.	±	D-7.100-143	BTS-1 Meg.	Br.-Blk.-Grn.	AVC Filter	
C78	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	FM RF Screen Byp. "	R98	470KΩ	±	D-7.100-129	BTS-470K	Yl.-Vi.-Yl.	Discharge Plate Load	
C79	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	FM RF Plate Decoup. "	R99	10KΩ	±	D-7.101-59	BTS-10K	Br.-Blk.-Or.	Peaking Resistor	
C80	100		C-4.109-10	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling "	R100	47Ω	±	D-7.100-197		Yl.-Vi.-Blk.	Parasitic Suppressor	
C81	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	FM Mixer Cath. "	R101	1 Meg.	±	D-7.100-143	BTS-1 Meg.	Br.-Blk.-Grn.	Hor. Output Grid	
C82	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	FM Mixer Plate Decoup. "	R102	11KΩ	2		BTS-11K	Br.-Br.-Or.	Hor. Output Screen Load	± 5%
C83	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	RF Bypass "	R103	100Ω	2	B-7.103-45		Br.-Blk.-Br.	Hor. Output Cathode	
C84	2.2		4.111-4					FM Osc. Coupling "	R104	3.3Ω	±	C-6.212-1		Or.-Or.-Gold	High Voltage Rectifier Filament	
C85	47		C-4.109-12	1468-00005	5W5Q5	MO.5-45	1FM-45	FM Osc. Grid "	R105	470KΩ	1	D-7.102-137	BTA-470K	Yl.-Vi.-Yl.	High Voltage Filter	
C86	1500		D-4.108-12	1467-0015	1W5D15		1FM-215	FM Osc. Plate Byp. "	R106	22KΩ	±	D-7.100-73	BTS-22K	Red-Red-Or.	Integrator Network	
C87	5000		B-4.115-1	1467-005	1D5D5	MW.5-25	1FM-25	Fil. Bypass "	R107	4700Ω	±	D-7.101-45	BTS-4700	Yl.-Vi.-Red	" "	
C88	47		C-4.109-12	1468-00005	5W5Q5	MO.5-45	1FM-45	AM Osc. Grid "	R108	2.2 Meg.	±	D-7.100-157	BTS-2.2 Meg.	Red-Red-Blue	Vert. Block Osc. Grid	
C89	5000		B-4.115-1	1467-005	1D5D5	MW.5-25	1FM-25	AVC Filter "	R109	6.8 Meg.	±	D-7.100-178	BTS-6.8 Meg.	Blue-Gray-Blue	Vert. Output Grid	
C90	10		C-4.109-16	1468-00001	5W5Q1		MS-41	Fixed Trimmer "	R110	1 Meg.	±	D-7.100-143	BTS-1 Meg.	Br.-Blk.-Grn.	Vert. Osc. Plate	
C91	500	10000	B-4.114					H.V. Filter	R111	1000Ω	1	D-7.102-24	BTA-1000	Br.-Blk.-Red	Vert. Output Decoupling	
C92	.05	400	D-3.100-19	484-05	DT4S5	ST-4-05	TM-15	AGC Filter	R112A	275Ω	10	B-6.211-2	ABA-300		Focus Coil Shunt-Notes 5 & 10	±10%
C93	.01	400	D-3.100-7	484-01	DT4S1	ST-4-01	TM-11	AGC Diode Filter	B	680Ω	10	B-6.211-3	ABA-750		" " " -Notes 6 & 11	±10%
C94	.1	400	D-3.100-23	484-.1	DT4P1	ST-4-1	TM-1	Video Coupling	R113A	250Ω	7	B-6.215-4	ABA-250		" " " -Notes 5 & 7	±10%
C95	.1	400	D-3.100-23	484-.1	DT4P1	ST-4-1	TM-1	Sync. Coupling	B	470Ω	7	B-6.215-5	ABA-500		" " " -Notes 6,7&12	±10%
C96	.01	400	D-3.100-7	484-01	DT4S1	ST-4-01	TM-11	AVC Filter	R114	10KΩ	1	D-7.102-66	BTA-10K	Br.-Blk.-Or.	FM RF Screen	
C97	.01	400	D-3.100-7	484-01	DT4S1	ST-4-01	TM-11	Lim. Plate Decoup.	R115	470Ω	±	D-7.100-3	BTS-470	Yl.-Vi.-Br.	FM Mixer Cathode	
C98	.01	400	D-3.100-7	484-01	DT4S1	ST-4-01	TM-11	Audio Coupling	R116	2200Ω	±	D-7.101-31	BTS-2200	Red-Red-Red	FM Mixer Plate Decoupling	
C99	.005	600	D-3.100-4	684-005	DT6D5	ST-6-005	TM-26	" "	R117	2200Ω	±	D-7.101-31	BTS-2200	Red-Red-Red	FM Osc. Plate Decoupling	
C100	.02	400	D-3.100-11	484-02	DT4S2	ST-4-02	TM-12	" "	R118	22KΩ	±	D-7.100-73	BTS-22K	Red-Red-Or.	FM Osc. Grid	
C101	.01	400	D-3.100-7	484-01	DT4S1	ST-4-01	TM-11	Tone Compensation	R119	22KΩ	±	D-7.100-73	BTS-22K	Red-Red-Or.	AM Osc. Grid	
C102	.015	200	D-3.100-43	484-015	DT4S15	ST-4-02	TM-12	" "	R120	22KΩ	1	D-7.102-82	BTA-22K	Red-Red-Or.	AM Conv. Screen	
C103	.003	600	D-3.100-3	684-003	DT6D3	ST-6-003	TM-23	Output Plate Bypass	R121	1 Meg.	±	D-7.100-143	BTS-1 Meg.	Br.-Blk.-Grn.	AVC Network	
C104	.01	600	D-3.100-8	684-01	DT6S1	ST-6-01	TM-11	Hor. Feedback Coup.	R122	1750Ω	25	B-6.216	DHA-20K		Low Voltage Bleeder-See Note 9	
C105	.005	600	D-3.100-4	684-005	DT6D5	ST-6-005	TM-25	Hor. Feedback Filter	R123	650Ω	7	B-6.215-6	ABA-750		Voltage Dropping-See Note 13	
C106	.01	400	D-3.100-7	484-01	DT4S1	ST-4-01	TM-11	DC Amp. Grid Filter	R124	1000Ω	±	D-7.100-17	BTS-1000	Br.-Blk.-Red	Accelerating Anode Decoupling	
C107	1.0	200	C-3.102-4	484-1	DT4W1	ST-2-1M	TC-10	DC Amp. Feedback								
C108	.05	400	D-3.100-19	484-05	DT4S5	ST-4-05	TM-15	Hor. Output Screen Byp.								

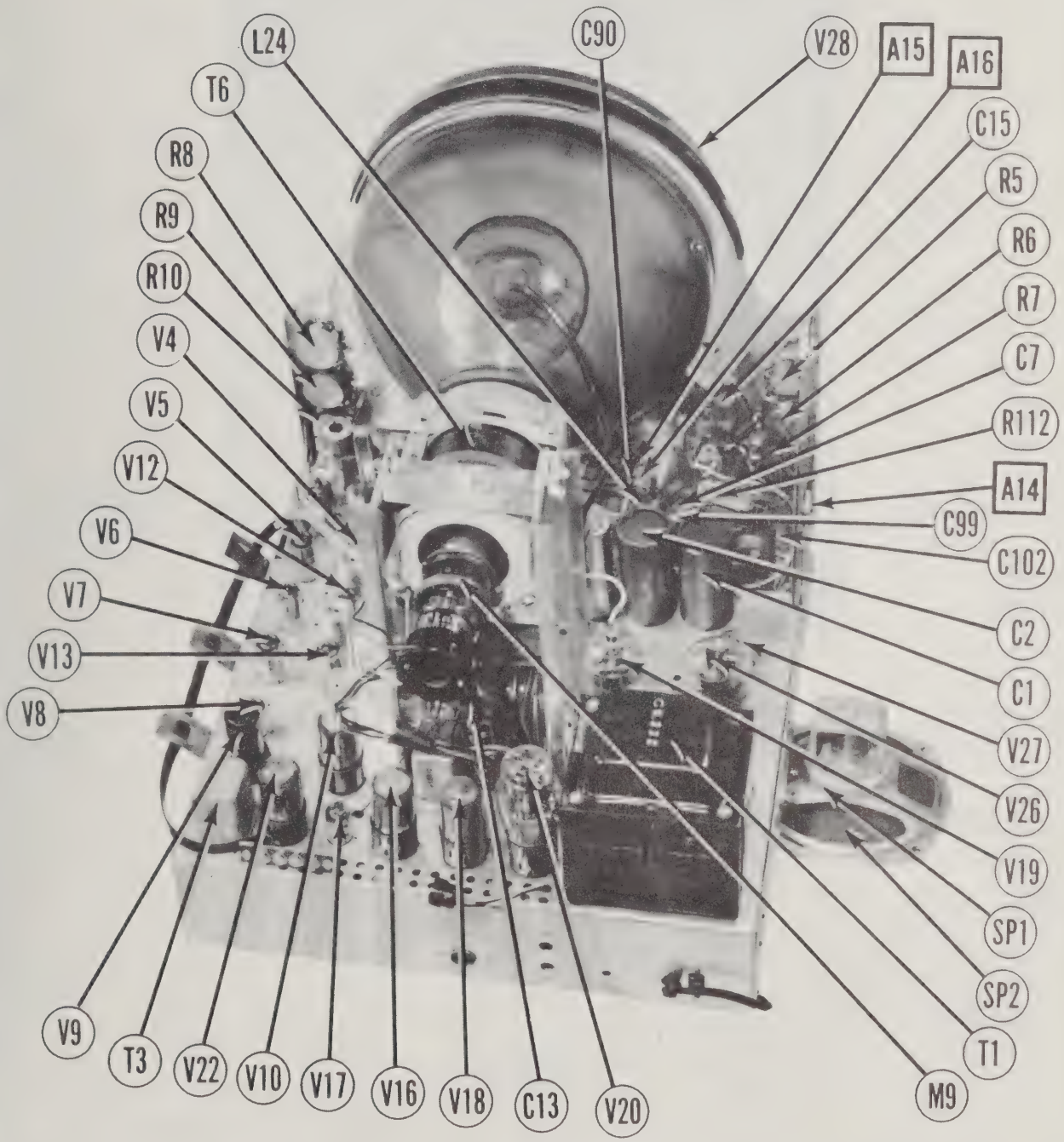
RESISTOR NOTES AND PARTS LIST CONTINUED ON PAGE 13.



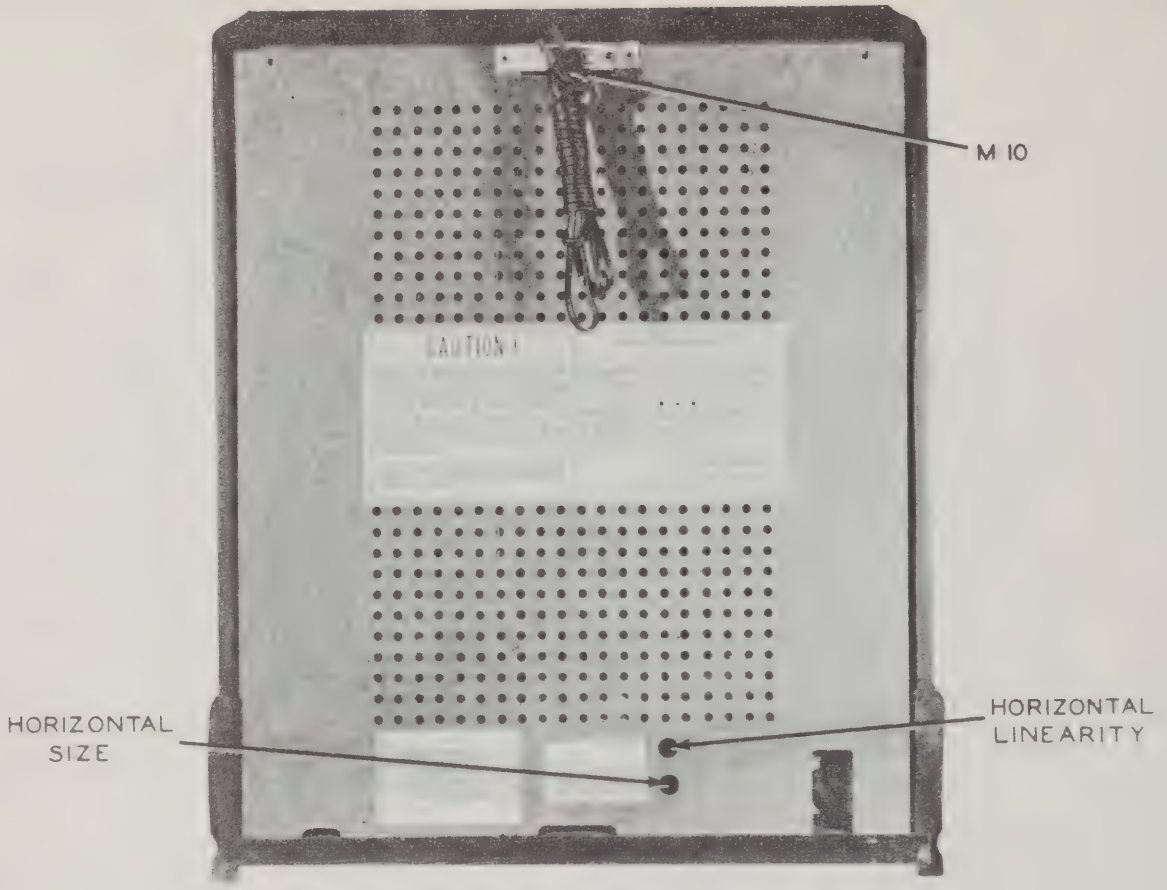
RF TUNER LEFT SIDE



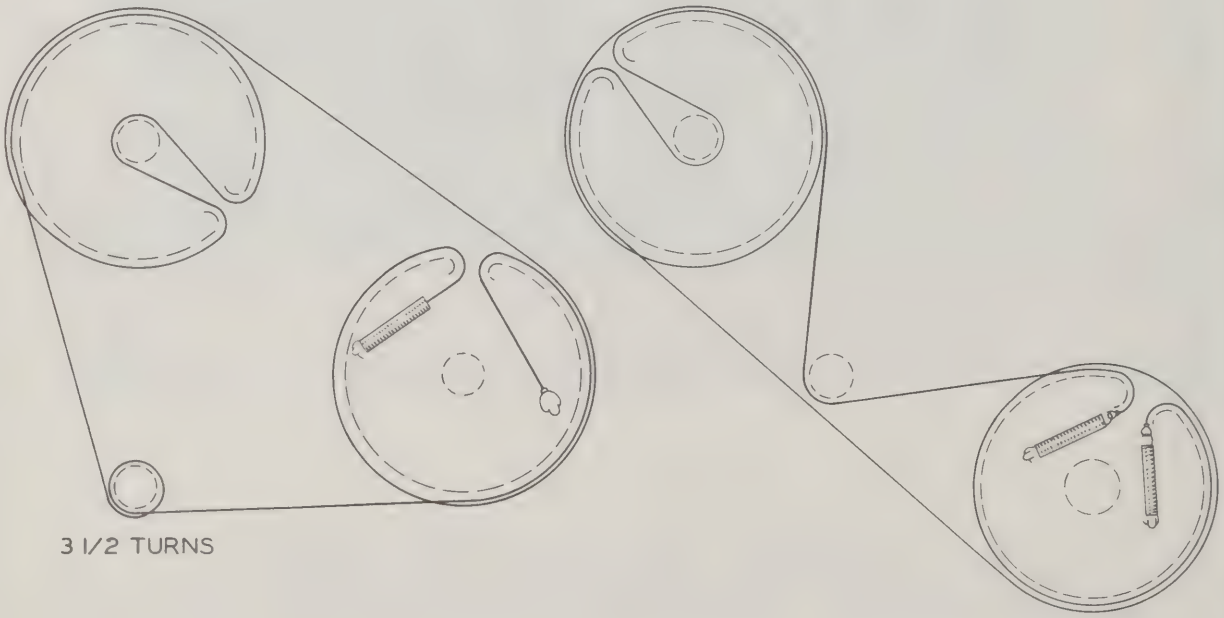
CHASSIS BOTTOM VIEW - RESISTOR IDENTIFICATION



CHASSIS TOP VIEW-LEFT SIDE



REAR PANEL ADJUSTMENTS



TUNING DIAL STRINGING

CHANNEL INDICATOR DIAL STRINGING

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (CONT.)

R125	100KΩ	½	D-7.101-101	BTS-100K	Br.-Blk.-Yl.	Voltage Divider
R126	47KΩ	½	D-7.100-87	BTS-47K	Yl.-Vi.-Or.	" "
R127	100KΩ	½	D-7.101-101	BTS-100K	Br.-Blk.-Yl.	" "
R128	33KΩ	½	D-7.100-38	BTS-33K	Or.-Or.-Red	Bias Network-See Note 8
R129	10KΩ	½	D-7.101-59	BTS-10K	Br.-Blk.-Or.	Converter Grid

Note 1-Early models used 1 Meg. in this application.
Note 2-Later productions use 180Ω in this application.
Note 3-Items R85 & R86 are matched pairs ± 1%. Replace as matched pairs.
Note 4-Items R88 & R89 are matched pairs ± 1%. Replace as matched pairs.
Note 5-Used in models with 10" picture tube.
Note 6-Used in models with 12" picture tube.
Note 7-Some models use parallel combinations to obtain desired resistance.
Note 8-Early models use 10KΩ in this application.
Note 9-Set slider of IRC replacement 2500Ω from one end.
Note 10-Set the slider of the IRC replacement 25Ω from one end.
Note 11-Set the slider of the IRC replacement 70Ω from one end.
Note 12-Set the slider of the IRC replacement 30Ω from one end.
Note 13-Set the slider of the IRC replacement 100Ω from one end.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	GAROD PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
T1	2.38 A. @ 117V.	215MA @ 800V. SEC. 4 2 Amp. @ 5 V.	93MA @ 550V. SEC. 5 3 Amp. @ 5 V.	10 Amp. @ 6.3V. SEC. 6 2 Amp. @ 5 V.	C-9.222			

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	SEC.	REPLACEMENT DATA GAROD PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	NOTES
T2	3.2Ω	7.8Ω	C-9.212	A-8120			Hor. Blocking Osc.Trans.
T3	160Ω	120Ω	C-9.213	A-8121		A-4070	Vert. Blocking Osc.Trans.
T4	410Ω tapped @ 170Ω	6.7Ω tapped @ 0.5Ω SEC. 2 0Ω	C-9.220				Hor. Output Trans.
T5	500Ω	4.5Ω	C-9.221				Vert. Output Trans.
T6A	15Ω		C-9.209				Hor. Deflection Yoke
B	60Ω						Vert. Deflection Yoke
T7	380Ω		C-9.211	FC-10			Focus Coil

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	SEC.	DC RES. PRI.	SEC.	REPLACEMENT DATA GAROD PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
T8	7000Ω	4.1Ω	575Ω	.3Ω	C-9.225	A-3823	T22847	A-2931	

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA GAROD PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	INSTALLATION NOTES
L1	215MA	90Ω	4 Henries	C-9.224	C-2325	20C55 1	C-2991	†Drill new mounting hole.
L2	94MA	60Ω	4 Henries	C-9.223	C-2304	20C53	C-2991	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	SEC.	REPLACEMENT DATA GAROD PART No.	MEISSNER PART No.	NOTES
L3	Ant. Trap		0Ω			Part of Television Tuner Part C-36.114
L4	" "		0Ω			
L5	Ant. Trans.		0Ω			
L6	Conv. Grid		.1Ω			
L7	Fil. Choke		0Ω			
L8	1st IF	.2Ω	0Ω			
L9	2nd Video IF	.2Ω		C-1.475-1		
L10	3rd " "	.2Ω		C-1.475-1		
L11	4th " "	.2Ω		C-1.475-1		
L12	5th " "	.5Ω	.5Ω	C-1.476		
L13	Video IF Decoupling		4Ω	C-1.465-7		
L14	Shunt Peaking		5.5Ω	C-1.465-1		
L15	Series Peaking		9Ω	C-1.465-8		
L16	Shunt Peaking		11.5Ω	C-1.465-9		
L17	Hor. Size		.5Ω	B-1.458		
L18	Hor. Linearity		35Ω	C-1.459		
L19	2nd Sound IF	.1Ω	.2Ω	C-1.477		
L20	3rd " "	.1Ω	.1Ω	C-1.477		
L21	Sound Disc.	.1Ω	.1Ω	C-1.461		
L22	FM Dipole			C-20.219		
L23	FM Input	0Ω	0Ω	C-1.480		
L24	FM RF Plate		1Ω	B-1.457		
L25	FM Osc. Grid		0Ω			
L26	FM Osc. Cath.		1Ω	B-1.457		
L27	FM Mixer Grid		0Ω	C-1.481		
L28	FM Mixer Fil.		0Ω	C-1.474		
L29	FM 1st IF	0Ω	0Ω	C-1.477		
L30	BC Loop	0Ω	1Ω	C-1.479		
L31	BC Osc.		6Ω	C-1.436-2		
L32	1st AM IF	16Ω	16Ω	C-1.445-3		
L33	2nd AM IF	16Ω	16Ω	C-1.445-3		

SPEAKER

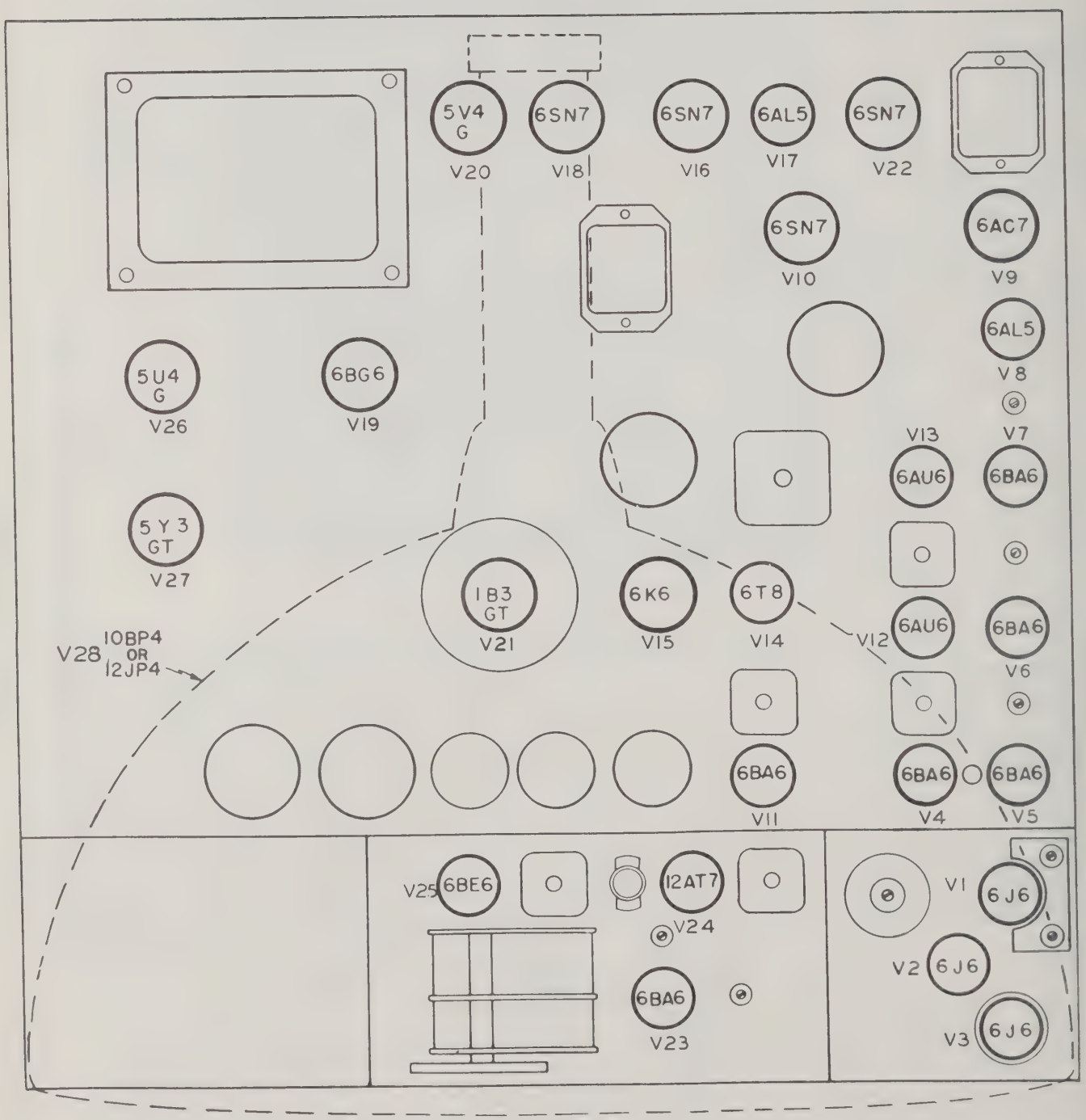
ITEM No.	RATING FIELD	V. C. IMP.	REPLACEMENT DATA GAROD PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1A	PM	4.1Ω	C-30.321	ST-110	6A21	Used in 900 & 1000 Series
B			C-30.320	ST-119*	10A31	Used in 1100 & 1200 Series
	CONE DIA.	V. C. DIA.				*Change output transformer to match 6-8Ω voice coil.
SP2	6"	9/16"				

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA GAROD PART No.		NOTES
M1	Bayonet	6-8	.15	Brown			Type 47 Television
M2	"	"	.25	Blue			Type 44 FM
M3	"	"	.25	"			Type 44 AM
M4	"	"	.25	"			Type 44 Phono

MISCELLANEOUS

ITEM No.	PART NAME	GAROD PART No.	NOTES
M5	Television Tuner Assy.	C-36.114	Includes RF, Converter and Oscillator Circuits
M6	Variable Capacitor FM & AM	C-2.218	
M7	Band Switch	B-11.220	
M8	Fuse 125MA		
M9	Beam Bender	36.122	Permanent Magnet Type
M10	Line Cord	20.217	
	Safety Glass	C-26.552	
	Dial Scale TV	C-26.554	
	Dial Scale FM-AM	C-26.553	
	Dial Spring	31.101	
	Plastic Pointer-Green	B-26.547-1	
	" " -Red	B-26.547-2	
	" " -Orange	B-26.547-3	
A15	Ceramic Trimmer 2.5-6 MMF.	C-4.113-2	



TUBE PLACEMENT CHART

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
V 1	6J6	60VDC	60VDC	6.3VAC	0V.	-.3VDC	-.3VDC	0V.	-	-
V 2	6J6	105VDC	105VDC	6.3VAC	0V.	-3VDC	-3VDC	0V.	-	-
V 3	6J6	60VDC	60VDC	6.3VAC	0V.	-3.5VDC§	-3.5VDC§	.2VDC	-	-
V 4	6BA6	-1.2VDC	0V.	6.3VAC	0V.	100VDC	100VDC	1.2VDC	-	-
V 5	6BA6	-.2VDC	0V.	6.3VAC	0V.	100VDC	100VDC	1.2VDC	-	-
V 6	6BA6	-.2VDC	0V.	6.3VAC	0V.	105VDC	105VDC	1.2VDC	-	-
V 7	6BA6	0V.	0V.	6.3VAC	0V.	110VDC	110VDC	110VDC	-	-
V 8	6AL5	1VDC	0V.	6.3VAC	0V.	1.2VDC	0V.	-.5VDC	-	-
V 9	6AC7	0V.	0V.	0V.	-.4VDC	2VDC	120VDC	6.3VAC	195VDC	-
V 10	6SN7GT	-.3VDC	60VDC	0V.	0V.	8VDC	1.1VDC	6.3VAC	0V.	-
V 11	6BA6	0V.	0V.	6.3VAC	0V.	130VDC	120VDC	1.4VDC	-	-
V 12	6AU6	-.1VDC	0V.	6.3VAC	0V.	110VDC	110VDC	.7VDC	-	-
V 13	6AL6	-.5VDC	0V.	6.3VAC	0V.	22VDC	41VAC	0V.	-	-
V 14	6T8	-.3VDC	-.8VDC	-.2VDC	6.3VAC	0V.	-1VDC	0V.	-.7VDC	PIN #9 60VDC
V 15	6K6GT	0V.	0V.	230VDC	250VDC	0V.	0V.	6.3VAC	16VDC	-
V 16	6SN7GT	0V.	370VDC	14VDC	-.5VDC	10VDC	0V.	6.3VAC	0V.	-
V 17	6AL5	0V.	0V.	6.3VAC	0V.	1.9VDC	0V.	-1.3VDC	-	-
V 18	6SN7GT	-40VDC	300VDC	0V.	-40VDC	140VDC	0V.	6.3VAC	0V.	-
V 19	6BG6-G	0V.	0V.	11.5VDC	0V.	0V.	0V.	6.3VAC	260VDC	**
V 20	5V4G	0V.	450VDC	0V.	380VDC	0V.	380VDC	0V.	450VDC	-
V 21	1B3GT		DO NOT MEASURE							
V 22	6SN7GT	0V.	370VDC	0V. 19VDC	-40VDC	50VDC 180VDC	0V.	6.3VAC	0V.	-
‡ V 23	6BA6	-.6VDC	0V.	0V.	6.3VAC	-	-	0V.	-	-
‡ V 24	12AT7	185VDC	-.3VDC§	0V.	0V.	0V.	185VDC	0V.	2.6VDC	PIN 9 6.3VAC
†† V 25	6BE6	-4VDC§	0V.	0V.	6.3VAC	215VDC	90VDC	-.1VDC	-	-
V 26	5U4G	0V.	400VDC	400VDC	400VAC	0V.	400VAC	0V.	400VDC	-
V 27	5Y3	0V.	145VDC	400VDC	220VAC	0V.	220VAC	0V.	145VDC	-

	PINS 1	2	3	4	5	6	7	8	9	10	11	12
V 28	10BP4	0V.	1VDC	-	-	-	-	-	-	-	270VDC	0V.	6.3VAC

**DO NOT MEASURE.
‡TAKEN IN FM POSITION.
††TAKEN IN BC POSITION.
§MEASURED WITH VTVM.

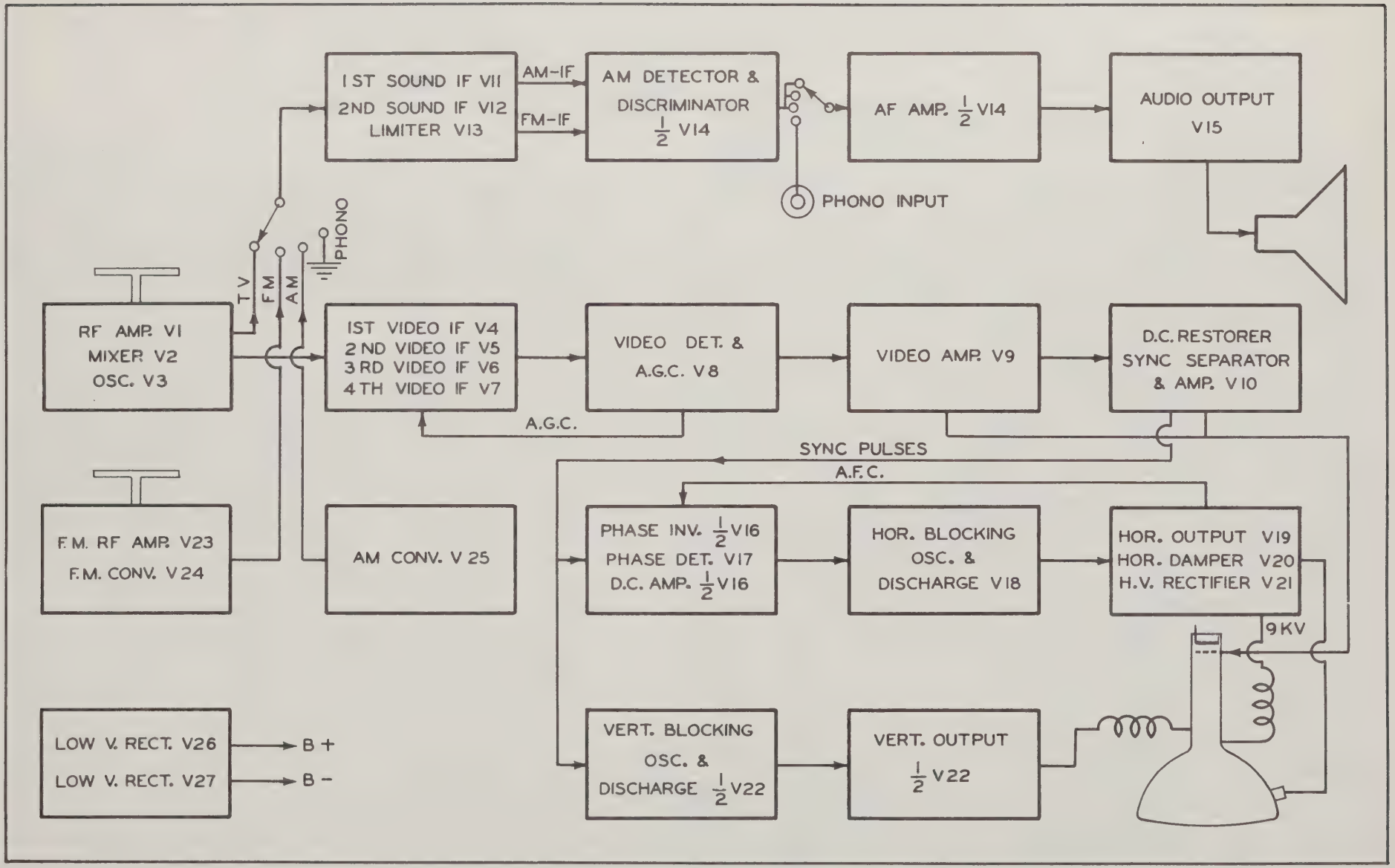
RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
V 1	6J6	3000Ω*	5000Ω*	.1Ω	0Ω	7500Ω	7500Ω	0Ω	-	-
V 2	6J6	2150Ω*	2150Ω*	.1Ω	0Ω	850KΩ	850KΩ	0Ω	-	-
V 3	6J6	6500Ω*	6500Ω*	.1Ω	0Ω	100KΩ	100KΩ	50Ω	-	-
V 4	6BA6	220KΩ	0Ω	.1Ω	0Ω	2400Ω*	2400Ω*	80Ω	-	-
V 5	6BA6	215KΩ	0Ω	.1Ω	0Ω	2250Ω*	2250Ω*	75Ω	-	-
V 6	6BA6	220KΩ	0Ω	.1Ω	0Ω	2350Ω*	2350Ω*	80Ω	-	-
V 7	6BA6	10KΩ	0Ω	.1Ω	0Ω	2350Ω*	2350Ω*	150Ω	-	-
V 8	6AL5	100KΩ	.5Ω	.1Ω	0Ω	6800Ω	0Ω	600KΩ	-	-
V 9	6AC7	0Ω	0Ω	0Ω	6800Ω	400Ω	15KΩ*	.1Ω	5000Ω*	-
V 10	6SN7GT	1 Meg.	20KΩ*	0Ω	0Ω	40KΩ*	150KΩ	.1Ω	0Ω	-
V 11	6BA6	0Ω	0Ω	.1Ω	0Ω	80Ω*	2200Ω*	100Ω	-	-
V 12	6AU6	450KΩ	0Ω	.1Ω	0Ω	2200Ω*	2200Ω*	65Ω	-	-
V 13	6AU6	45KΩ	0Ω	.1Ω	0Ω	50KΩ*	45KΩ*	0Ω	-	-
V 14	6T8	100KΩ	100KΩ	200KΩ	.1Ω	0Ω	1 Meg.	0Ω	10 Meg.	PIN 9 220KΩ*
V 15	6K6GT	INF.	0Ω	2800Ω†	2300Ω†	470KΩ	INF.	.1Ω	550Ω	-
V 16	6SN7GT	47KΩ	2400Ω†	2200Ω	INF.	200KΩ†	0Ω	.1Ω	0Ω	-
V 17	6AL5	10KΩ	10KΩ	.1Ω	0Ω	INF.	0Ω	INF.	-	-
V 18	6SN7GT	240KΩ	120KΩ†	0Ω	240KΩ	INF.	0Ω	.1Ω	0Ω	-
V 19	6BG6-G	INF.	0Ω	100Ω	1 Meg.	1 Meg.	INF.	.1Ω	11KΩ†	INF.
V 20	5V4G	INF.	INF.	INF.	100Ω†	INF.	100Ω†	INF.	INF.	-
V 21	1B3GT	INF.	INF.	INF.	INF.	INF.	INF.	INF.	INF.	INF.
V 22	6SN7GT	7 Meg.	1500Ω†	0Ω 5000Ω	2.2 Meg.	1 Meg. 6 Meg.††	0Ω	.1Ω	0Ω	-
‡ V 23	6BA6	500KΩ	0Ω	0Ω	.1Ω	65Ω*	10KΩ*	0Ω	-	-
‡ V 24	12AT7	2200Ω*	20KΩ	1Ω	0Ω	0Ω	2200Ω*	0Ω	470Ω	PIN 9 .1Ω
†† V 25	6BE6	20KΩ	.5Ω	0Ω	.1Ω	80Ω*	20KΩ*	1.5 Meg.	-	-
V 26	5U4G	INF.	7500Ω	7500Ω	165Ω	INF.	165Ω	INF.	7500Ω	-
V 27	5Y3	INF.	18KΩ	7500Ω	155Ω	INF.	155Ω	INF.	18KΩ	-

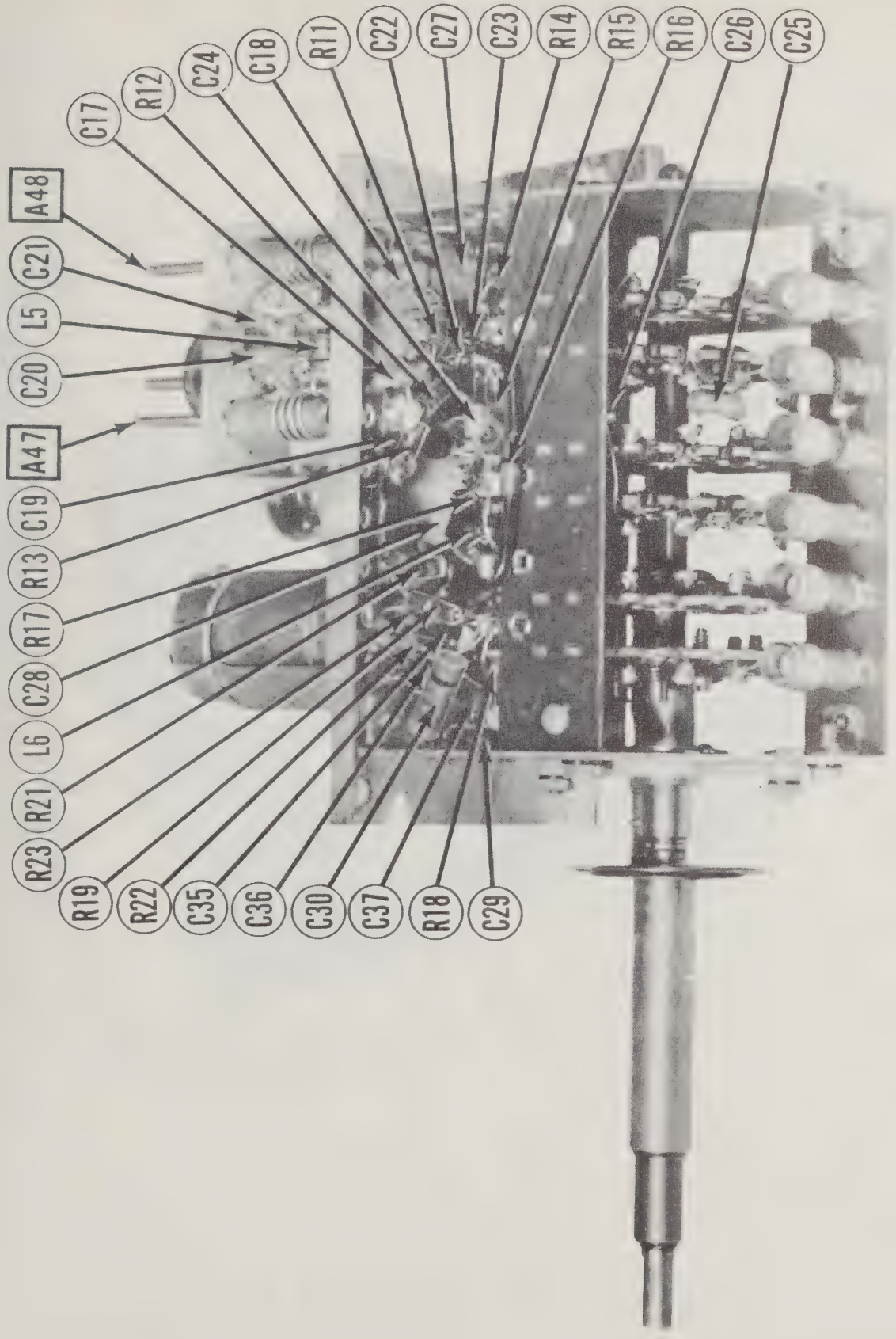
	PINS 1	2	3	4	5	6	7	8	9	10	11	12
V 28	10BP4	0Ω	200KΩ	INF.	INF.	INF.	INF.	INF.	INF.	INF.	35KΩ	0Ω	.1Ω

‡TAKEN IN FM POSITION.
††TAKEN IN BC POSITION.
*MEASURED FROM PIN #1 OF 5Y3 (V27).
†MEASURED FROM PIN #8 OF 5U4 (V26).
ALL READINGS TAKEN IN TV POSITION UNLESS OTHERWISE STATED.

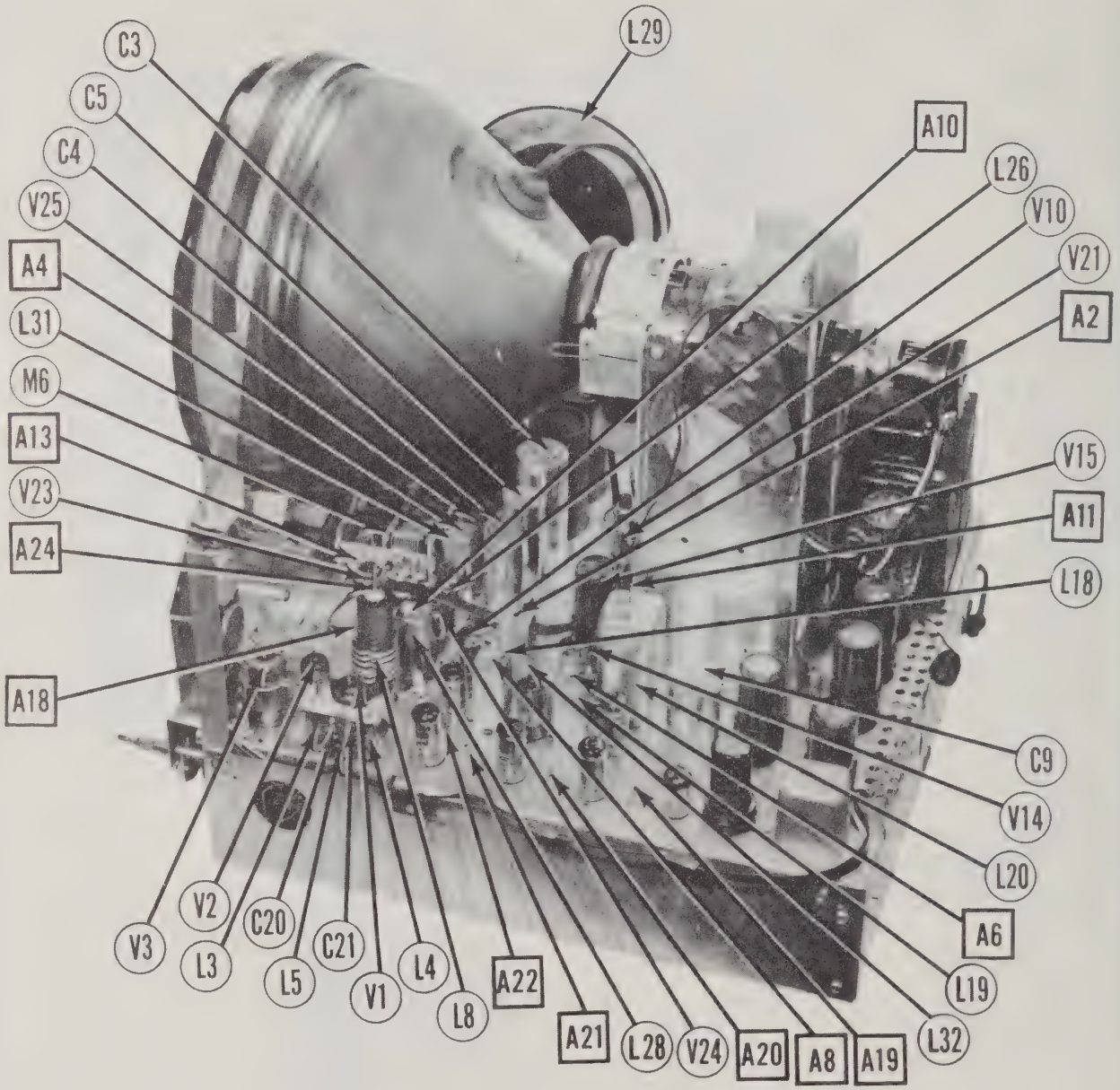
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at maximum.
6. Where readings may vary according to the setting of the rear panel controls, both minimum and maximum readings are given.



BLOCK DIAGRAM



RF TUNER—RIGHT SIDE



CHASSIS TOP VIEW-RIGHT SIDE

DISASSEMBLY INSTRUCTIONS

MODEL 900TV

1. Remove two screws holding back and remove.
2. Remove four push-on type knobs on front panel.
3. Loosen set screws in six remaining knobs and remove.
4. Remove two screws holding power interlock.
5. Unclip FM antenna leads from top of cabinet.
6. Unplug speaker.
7. Remove six chassis bolts and lock washers from bottom of cabinet.
8. Remove four nuts holding speaker and remove speaker.
9. Loosen three metal clips holding power cord to cabinet.
10. Slide chassis out rear of cabinet.

GLOBE
MODEL 559

GLOBE
MODEL 559

GLOBE MODEL 559

TRADE NAME	Globe, Model 559
MANUFACTURER	Globe Electronics, Inc., 225 W. 17th St., New York, N.Y.
TYPE SET	AC-DC Operated Superheterodyne Receiver
TUBES (FIVE)	Types, 12BE6 Converter, 12BA6 IF Amp., 12AT6 Det.-AVC-AF, 50B5 Power Output, 35W4 Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1600KC RATING .26 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 7 (grid) of 12BE6. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	200 MMFD	High side top of ant. coil primary. Low side to chassis.	1600KC	"	"	A5	Adjust for maximum output.
3	200 MMFD	"	1400KC	Tune for maximum output.	"	A6	" " " "

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		GLOBE PART No.	STANDARD REPLACEMENT		
1	Converter	12BE6	12BE6	7CH	
2	IF Amp.	12BA6	12BA6	7BK	
3	Det.-AVC-Audio	12AT6	12AT6	7BT	
4	Power Output	50B5	50B5	7BZ	
5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	GLOBE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
6A	50	150		AF1010D	UP4415	DY-2x50-150	EL-25	■ Filter
B	50	150						▲ ■
7	.05	400		484-05	DT4S5	ST-4-05	TC-15	Line Filter
8	.02	600		684-02	DT6S2	ST-6-02	TC-12	Output Plate Bypass
9	.004	150		484-004	ZZW1D4	ST-6-004		Audio Coupling
10	.05	400		484-05	DT4S5	ST-4-05	TC-15	AVC Filter
11	.01	150		484-01	ZZW1S1	ST-4-01		Ext. Ant. Isolation
12	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
13	1500	500		1467-0015	1W5D15	MW.5-215	1FM-215	Audio Coupling
14	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	Diode RF Filter
15	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	RF Coupling

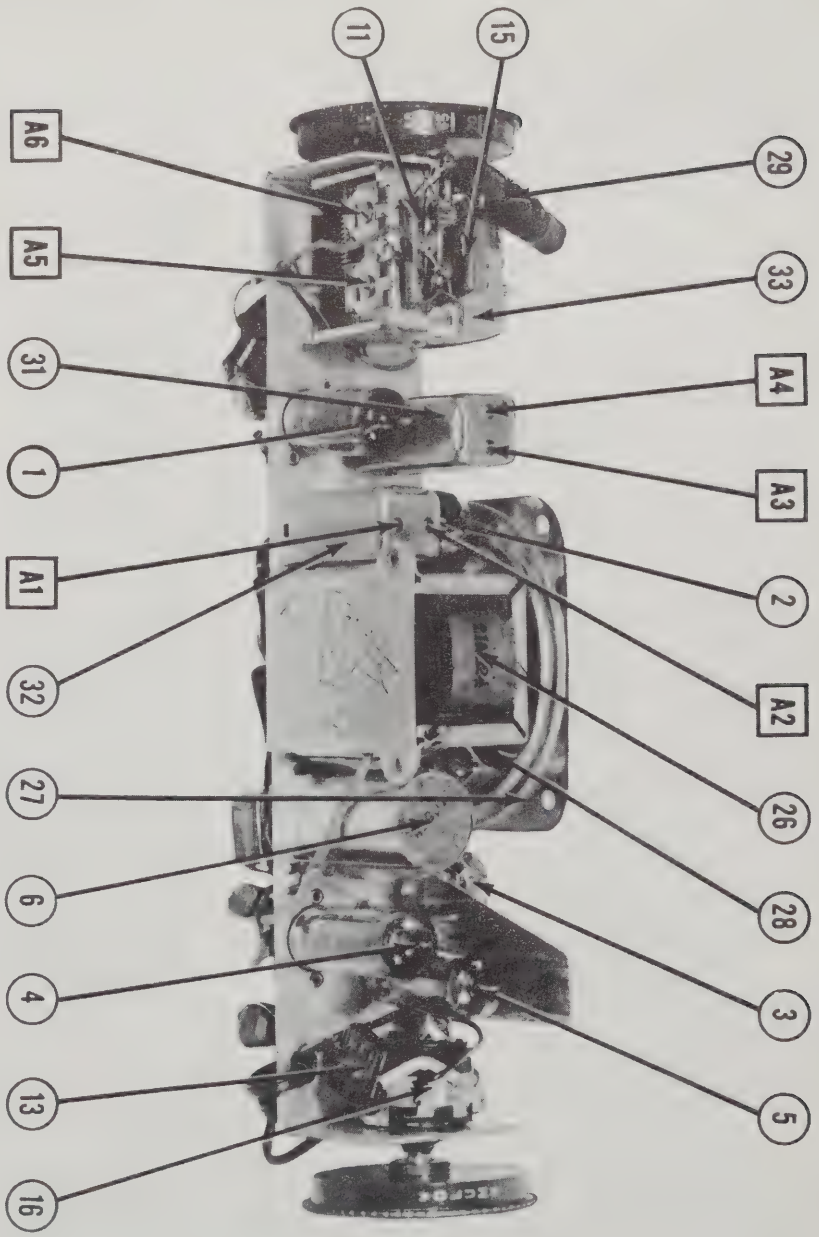
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	GLOBE PART No.	IRC PART No.	CLAROSTAT PART No.	
16A	500KΩ	½		D13-133	M-60-Z	Volume Control
B	Shaft			A	Not Req.	Attach to 16A per instructions
C	Switch			41	SW-A	■ ■ ■ ■ ■

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	GLOBE PART No.	IRC PART No.	
17	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Conv. Grid
18	22KΩ	½		BTS-22K	Red-Red-Or. Osc. Grid
19	1.5 Meg.	½		BTS-1.5 Meg.	Br.- Br.-Grn. AVC Network
20	170Ω	½		BW-½-180	Br.-Vi.-Br. IF Cathode
21	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
22	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AF Plate Load
23	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
24	170Ω	½		BW-½-180	Br.-Vi.-Br. Output Cathode
25	1200Ω	1		BTA-1200	Br.-Red-Red Filter

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		GLOBE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
26	17000Ω	3.3Ω	119Ω	.45Ω	21AB24	A-3876	T22S45	A-2928	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			GLOBE PART No.	JENSEN PART No.	QUAM PART No.	
27	FIELD	VC IMP.	32PL5		3A07	
	PM	3.3Ω				
28	CONE DIA.	VC DIA.				
	3-3/8"	9/16"				

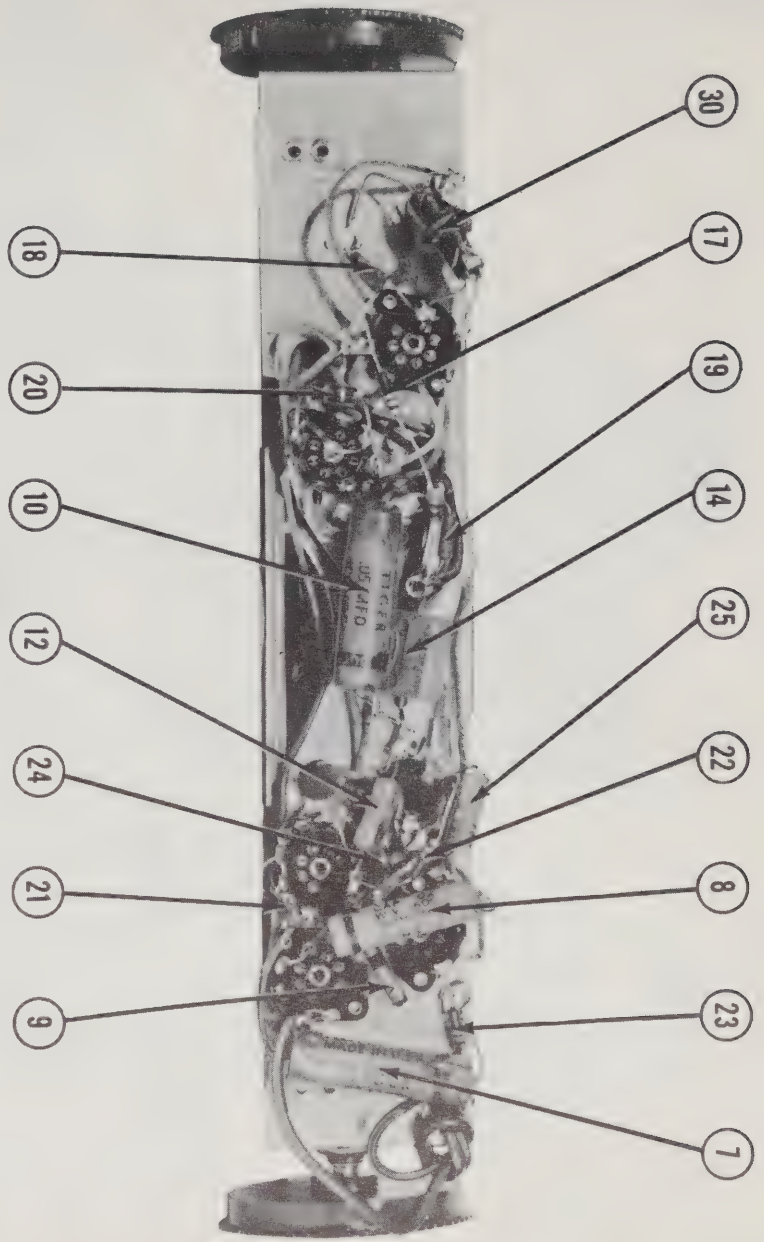
R F COILS

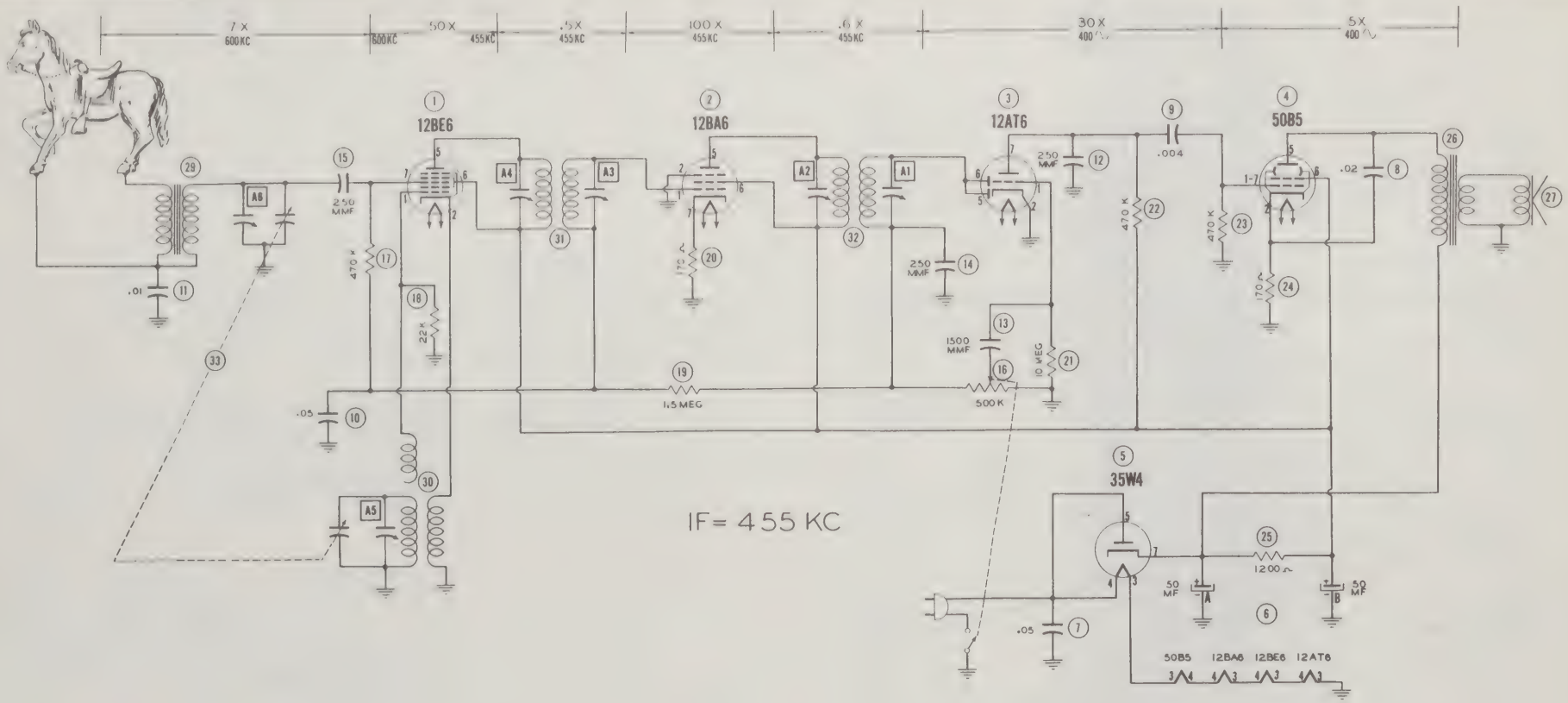
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	GLOBE PART No.	MEISSNER PART No.	
29	Ant. Coil	0Ω	4.3Ω			
30	Osc. Coil	.5Ω	6.5Ω			
31	Input IF	12.8Ω	12.5Ω		16-6668	
32	Output IF	16Ω	22Ω		16-6669	

MISCELLANEOUS

ITEM No.	PART NAME	GLOBE PART No.	NOTES
33	2 Gang Var. Cap		(20-382MMF, 26-153MMF)

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	-7VDC§	0V.	11VAC	23VAC	95VDC	95VDC	-.2VDC
2	12BA6	-.2VDC	0V.	23VAC	36VAC	95VDC	95VDC	1.7VDC
3	12AT6	-.7VDC	0V.	0V.	11VAC	-.6VDC	-.6VDC	50VDC
4	50B5	0V.	[illegible]VAC	85VAC	36VAC	120VDC	95VDC	0V.
5	35W4	[illegible]	0V.	85VAC	117VAC	117VAC	110VAC	125VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	22KΩ	0Ω	13Ω	[illegible]Ω	70KΩ	70KΩ	[illegible] Meg.
2	12BA6	2 Meg.	0Ω	.7Ω	42Ω	[illegible]KΩ	70KΩ	170Ω
3	12AT6	10 Meg.	0Ω	0Ω	13Ω	[illegible]KΩ	560KΩ	540KΩ
4	50B5	470KΩ	170Ω	90Ω	42Ω	70KΩ	70KΩ	470KΩ
5	35W4	170Ω	INF.	90Ω	130Ω	130Ω	110Ω	70KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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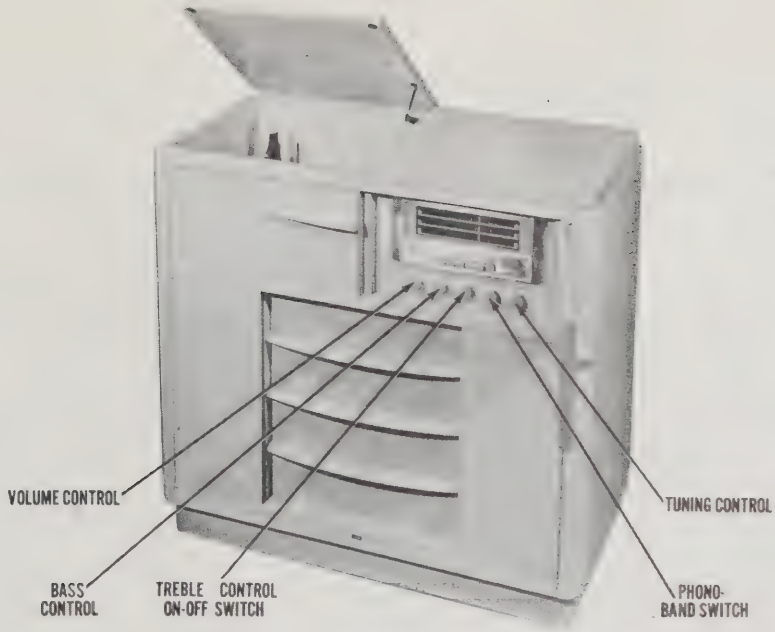
4820-8

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**



HOFFMAN MODEL C-503

TRADE NAME	Hoffman, Models C-503, C-513
MANUFACTURER	Hoffman Radio Corp., 3761 S. Hill St., Los Angeles, Calif.
TYPE SET	AC Operated Combination Phono-Recorder-Radio, Multi-Band Superheterodyne Receiver
TUBES	(FOURTEEN) Types, 6SK7 RF Amp., 6SA7 Converter, 6SK7 IF Amp., 6SQ7 Det.-AVC-AF, 6J5 Tone Control, 6J5 Phase Inv., 6SJ7 Mic. Pre-Amp., 6SQ7 Mic. Amp., 6U5/6G5 Record Level Ind., (4) 6K6GT Power Output, 5U4G
POWER SUPPLY	110-120 Volts AC RATING .94 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC **SHORT WAVE** Band "B"-5.6-10.4MC, Band "C" 9.4-19.4MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set dial pointer turn tuning cap. fully closed and set pointer 1-3/4" from left edge of dial backplate. This is the calibration mark referred to in Steps below.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to chassis.	455KC	Band"A" (2 positions from fully clockwise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output
2	400Ω carbon res.	High side to ext. ant. clip. Low side to chassis.	18MC	Band"C" (fully clockwise)	5-13/16" from calibration mark	"	A5	" " " "
3	"	"	"	"	Tune for maximum output.	"	A6,A7	Rock tuning cap. and adjust for maximum output.
4	"	"	10MC	Band"B" (1 position from fully clockwise)	5-15/16" from calibration mark.	"	A8	Adjust for maximum output Tune signal generator to 10.91MC. If signal is not heard, retune sig. gen. to 10MC and open A8 to next peak. Adjust for maximum output and recheck for image.
5	"	"	"	"	Tune for maximum output.	"	A9,A10	Rock tuning cap. and adjust for maximum output.
6	200MMF'D	"	1400KC	Band"A"	5-29/32" from calibration mark	"	A11	Adjust for maximum output
7	200MMF'D	"	"	"	Tune for maximum output.	"	A12,A13	" " " "
8	200MMF'D	"	600KC	"	"	"	A14,A15	Adjust for maximum output Repeat Steps 6, 7 & 8 until no further improvement can be made.

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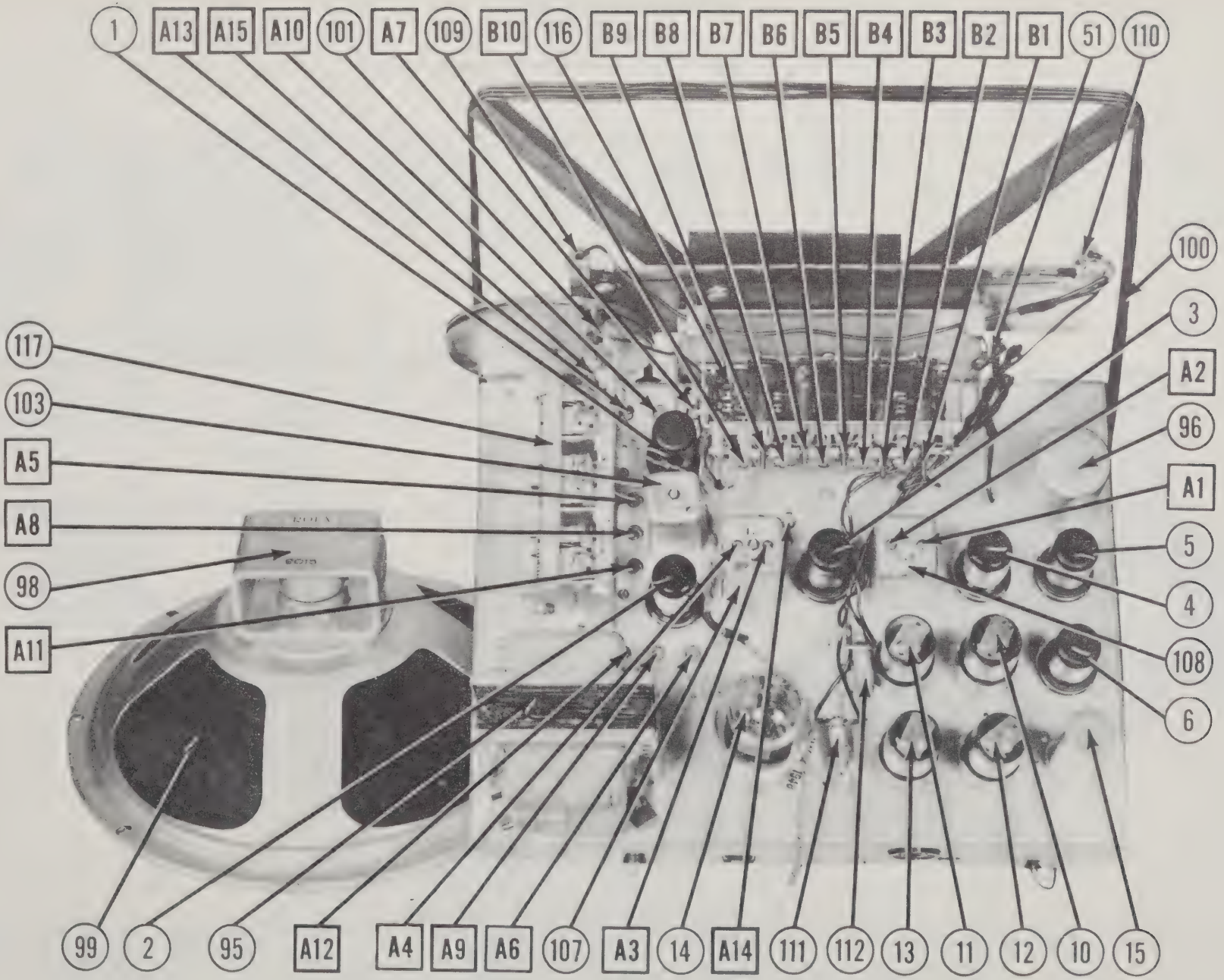
DATE 11/48-#4820-9 SET #50-FOLDER #9

HOFFMAN MODELS
C-503, C-513

HOFFMAN MODELS
C-503, C-513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A13
A15
A10
101
A7
109
B10
116
B9
B8
B7
B6
B5
B4
B3
B2
B1
51
110
100
3
A2
96
A1
5
4
108
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117
103
A5
A8
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A3
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97
118
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104
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47
50
59
33
102
35

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: HOFFMAN PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6SK7	6SK7	8N	
2	Converter	6SA7	6SA7	8R	
3	IF Amp.	6SK7	6SK7	8N	
4	Det.-AVC-AF	6SQ7	6SQ7	8Q	
5	Tone Control	6J5	6J5	6Q	
6	Phase Inv.	6J5	6J5	6Q	
7	Mic. Pre-Amp.	6SJ7	6SJ7	8N	
8	Mic. Amp.	6SQ7	6SQ7	8Q	
9	Record Level Ind.	6U5/6G5	6U5/6G5	6R	
10	Power Output	6K6GT	6K6GT	7S	
11	" "	6K6GT	6K6GT	7S	
12	" "	6K6GT	6K6GT	7S	
13	" "	6K6GT	6K6GT	7S	
14	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: HOFFMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
15A	20	450	4200	AF44J4A	UP2245C	DY-312	EL-350	▲ Filter
B	20	450						■ "
C	20	25						Cathode Bypass
16	10	475		PRS450/10	BR1045	M-10-450	UT-12	Decoupling
17	10	475		PRS450/10	BR1045	M-10-450	UT-12	"
18	10	450	4203	PRS450/10	BR1045	M-10-450	UT-12	"
19	100	25		PRS25/100	BRH251	M-100-25	UHC-102	Cathode Bypass
20	.01	600	4103	684-01	DT6S1	ST-6-01	TC-11	Line Filter
21	.001	600	4104	684-001	DT6D1	ST-6-001	TC-21	Output Plate Bypass
22	.001	600	4104	684-001	DT6D1	ST-6-001	TC-21	" " "
23	.02	400	4106	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
24	.02	400	4106	484-02	DT4S2	ST-4-02	TC-12	" "
25	.01	400	4112	484-01	DT4S1	ST-4-01	TC-11	" "
26	.01	400	4112	484-01	DT4S1	ST-4-01	TC-11	Tone Compensation
27	.005	600	4102	684-005	DT6D5	ST-6-005	TC-25	" "
28	.5	400		484-.5	DT4P5	ST-4-5	TC-5	" "
29	.002	600		684-002	DT6D2	ST-6-002	TC-22	" " -Note
30	.01	400	4112	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
31	.005	600	4102	684-005	DT6D5	ST-6-005	TC-25	" "
32	.05	400	4101	484-05	DT4S5	ST-4-05	TC-15	RF Bypass Pwr. Supply
33	.05	400	4101	484-05	DT4S5	ST-4-05	TC-15	" " " "
34	.05	200	4100	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
35	.05	200	4100	484-05	DT2S5	ST-4-05	TC-15	" "
36	.005	600	4102	684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
37	.02	400	4106	484-02	DT4S2	ST-4-02	TC-12	" "
38	.01	600	4103	684-01	DT6S1	ST-6-01	TC-11	Record Level Grid Filter
39	.05	400	4101	484-05	DT4S5	ST-4-05	TC-15	Mic. Amp. Screen Bypass
40	.005	600	4102	684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
41	.01	600	4103	684-01	DT6S1	ST-6-01	TC-11	" "
42	100	500	4000	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass
43	330	300	4010	1468-0003	5W5T3	MO.5-33	1FM-335	Tone Compensation-Cer.
44	330	300	4010	1468-0003	5W5T3	MO.5-33	1FM-335	" " "
45	650	300	4011	1468-00075	5W5T7	MO.3-37	1FM-37	" " "
46	100	500	4000	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
47	100	500	4000	1468-0001	5W5T1	MO.5-31	1FM-31	" " "
48	1650	500	4005					Fixed Padder
49	2300	500	4006					"
50	47	500	4007	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.
51	500	500	4004	1469-0005	5R5T5	MOS.5-35	MS-35	Fixed Trimmer

Note-Not used in all models.

PARTS LIST AND DESCRIPTIONS (Continued)

TONE CHOKE

ITEM NO.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: HOFFMAN PART NO.	REPLACEMENT DATA: STANCOR PART NO.	REPLACEMENT DATA: THORDARSON PART NO.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
96		12Ω	3.7 Henries	5103				

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: HOFFMAN PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
97	9000Ω CT	4Ω	450Ω CT	.3Ω	5108	A-3870	T22856	A-2904#	#Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: FIELD	RATINGS: VC IMP.	REPLACEMENT DATA: HOFFMAN PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
96	PM	4Ω	9015	ST-102† Mod. P12-S	12A6†	†Replace output transformer to match 6-8 voice coil.
99	CONE DIA. 11-7/16"	VC DIA. 1"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: HOFFMAN PART No.	REPLACEMENT DATA: MEISSNER PART No.
100	Loop Ant.	.2Ω	.2Ω	55210	
101	Loop Load Coil		.5Ω	5220	
	Band				
102A	Ant. Coil B	.2Ω	.2Ω	5217	
B	" " C	.1Ω	0Ω		
103	RF Coil A	1Ω	3.5Ω	5216	
104A	" " B	8Ω	2.3Ω	5219	
B	" " C	.8Ω	3Ω		
105	Osc.Coil A		4.5Ω	5215	14-1060
106A	" " B		0Ω	5218	
B	" " C		0Ω		
107	Input IF	13Ω	12Ω	5213	16-6658
108	Output IF	13.5Ω	13Ω	5214	16-6660

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: HOFFMAN PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
109-112	Bayonet	6-8	0.25	Blue			Type 44

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA: HOFFMAN PART No.	REPLACEMENT DATA: ASTATIC PART No.	REMARKS
113		QT3-M	QT3-M Original Part

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA HOFFMAN PART No.	REPLACEMENT DATA IRC PART No.	REPLACEMENT DATA CLAROSTAT PART No.	INSTALLATION NOTES
52A	500KΩ	½	4804	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 52A per instructions
53A	50KΩ	½	4806	D11-123	M-44-S	Bass Control
B	Shaft		Not Req.	A	Not Req.	Attach to 53A per instructions
54A	250KΩ	½	4805	D13-130	M-64-Z	Treble Control
B	Shaft		Not Req.	A	Not Req.	Attach to 54A per instructions
C	Switch		" "	41	SW-A	" " " " "
55A	500KΩ	½	4802	D13-133	M-60-Z	Mike Control
B	Shaft		Not Req.	A	Not Req.	Attach to 55A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA HOFFMAN PART No.	REPLACEMENT DATA IRC PART No.	IDENTIFICATION CODES
56	100KΩ	½	4511	BTS-100K	Br.-Blk.-Yl. AVC Network
57	22KΩ	½	4501	BTS-22K	Red-Red-Or. Osc. Grid
58	10KΩ	2	4503	BT-2-10K	Br.-Blk.-Or. Screen Dropping
59	2.2 Meg.	½	4502	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
60	10 Meg.	½	4505	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
61	220KΩ	½	4500	BTS-220K	Red-Red-Yl. AF Plate Load
62	1 Meg.	½	4513	BTS-1 Meg.	Br.-Blk.-Grn. Tone Amp. Grid
63	2200Ω	½	4512	BTS-2200	Red-Red-Red Tone Amp. Cathode
64	22KΩ	½	4501	BTS-22K	Red-Red-Or. Tone Amp. Cathode
65	10KΩ	½	4515	BTS-10K	Br.-Blk.-Or. Tone Amp. Plate Load
66	3000Ω	½		BTS-3300	Or.-Blk.-Red Tone Compensation
67	220KΩ	½	4500	BTS-220K	Red-Red-Yl. " "
68	1 Meg.	½	4513	BTS-1 Meg.	Br.-Blk.-Grn. Phase Inv. Grid
69	220KΩ	½	4500	BTS-220K	Red-Red-Yl. Isolation
70	2200Ω	½	4512	BTS-2200	Red-Red-Red Phase Inv. Cathode
71	47KΩ	½	4504	BTS-47K	Yl.-Vi.-Or. " " "
72	47KΩ	½	4504	BTS-47K	Yl.-Vi.-Or. Phase Inv. Plate Load
73	4700Ω	½		BTS-4700	Yl.-Vi.-Red Decoupling
74	470KΩ	½	4506	BTS-470K	Yl.-Vi.-Yl. Output Grid
75	470KΩ	½	4506	BTS-470K	Yl.-Vi.-Yl. " "
76	200Ω	3	4519	AB-200	Red-Red-Br. Output Cathode
77	1500Ω	10		AB-1500	Br.-Grn.-Red Filter
78	47KΩ	½	4504	BTS-47K	Yl.-Vi.-Or. Tone Compensation
79	47KΩ	½	4504	BTS-47K	Yl.-Vi.-Or. " "
80	22KΩ	½	4501	BTS-22K	Red-Red-Or. " "
81	470KΩ	½	4506	BTS-470K	Yl.-Vi.-Yl. Phono Shunt
82	1 Meg.	½	4513	BTS-1 Meg.	Br.-Blk.-Grn. Record Level Rect. Load
83	220KΩ	½	4500	BTS-220K	Red-Red-Yl. Voltage Dropping
84	1 Meg.	½	4513	BTS-1 Meg.	Br.-Blk.-Grn. Mic. Pre-Amp. Grid
85	4700Ω	½		BTS-4700	Yl.-Vi.-Red Mic. Pre-Amp. Cathode
86	2.2 Meg.	½	4502	BTS-2.2 Meg.	Red-Red-Grn. Mic. Pre-Amp. Screen
87	470KΩ	½	4506	BTS-470K	Yl.-Vi.-Yl. Mic. Pre-Amp. Plate Load
88	10 Meg.	½	4505	BTS-10 Meg.	Br.-Blk.-Blue Mic. Amp. Grid
89	220KΩ	½	4500	BTS-220K	Red-Red-Yl. Mic. Amp. Plate Load
90	1Ω	1	4707	BW-1-1	Br.-Blk.-Gold Voltage Dropping
91	.51Ω	1	4708	BW-1-.51	Grn.-Br.-Silver Cutting Head Impedance Matching
92	47KΩ	1	4516	BTS-47K	Yl.-Vi.-Or. Voltage Dropping
93	1 Meg.	½	4513	BTS-1 Meg.	Br.-Blk.-Grn. Record Level Grid
94	1 Meg.	½	4513	BTS-1 Meg.	Br.-Blk.-Grn. Record Level Plate Load
119	47KΩ	½	4504	BTS-47K	Yl.-Vi.-Or. Diode Filter

TRANSFORMER (POWER)

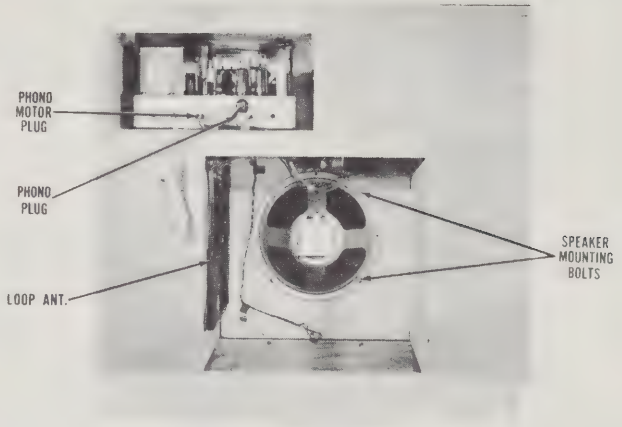
ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA HOFFMAN PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA THORDARSON PART No.	REPLACEMENT DATA MERIT PART No.
95	117V AC @ .34A	620V CT @ .13ADC	5.2V AC @ 3.0A	6.3V AC @ 4.6A	8001-4	P-4031‡		P-3155‡

‡Drill new mounting holes and add series resistor to reduce plate voltage.

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

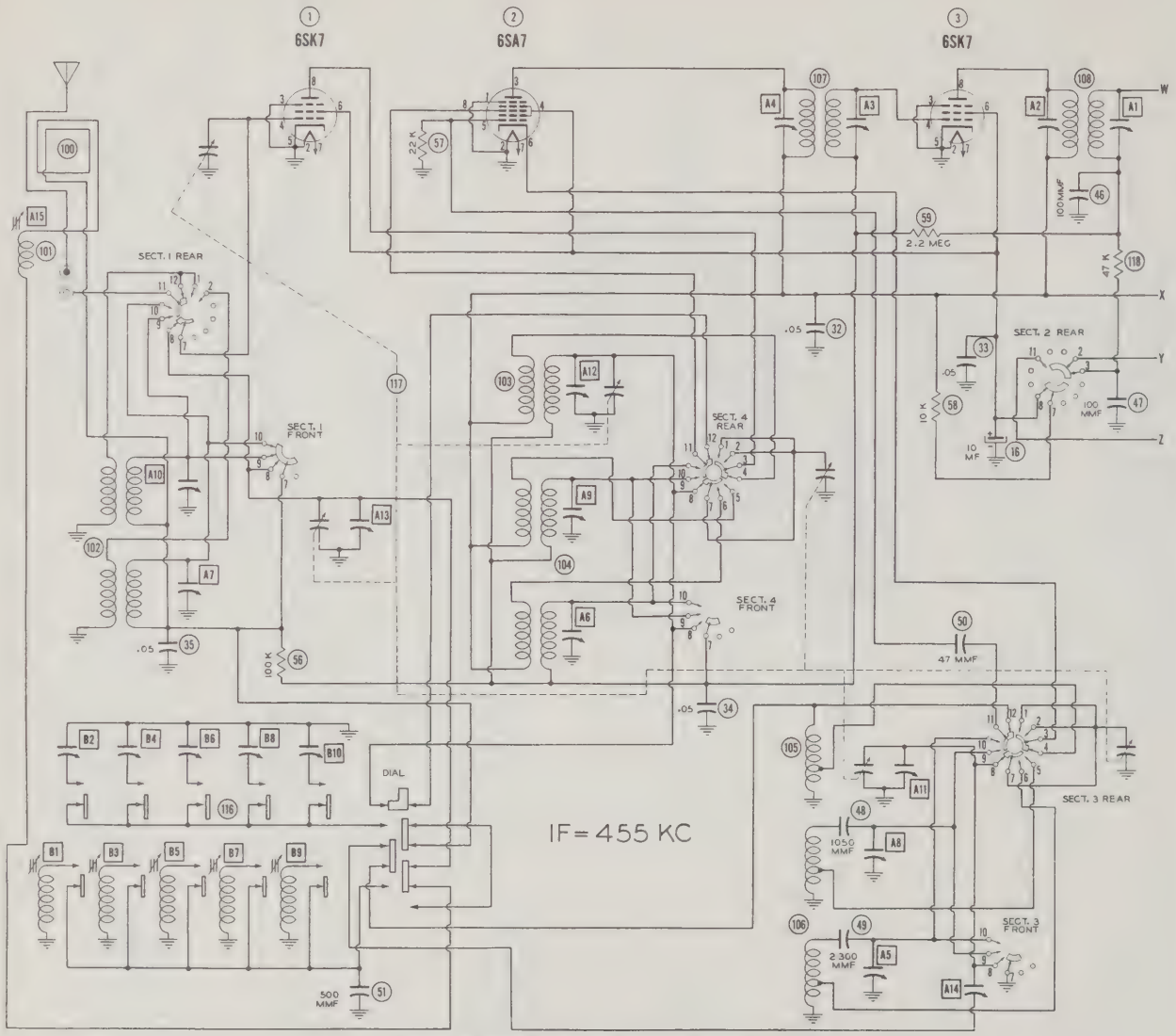
ITEM No.	PART NAME	HOFFMAN PART No.	NOTES
114	Switch	6005	Band
115	"	6003	Recorder On-Off
116	"	6004	Pushbutton Assembly
117A	3 Gang Var. Cap.	4403	BC (12-277MMF) each section
B	" " " "		SW (11-172MMF) " "
A6	Trimmer Strip	4300	Band "C" Osc. Adj.
A8	"		" "B" " "
A11	"		" "A" " "
A6	"	4300	" "C" RF "
A9	"		" "B" " "
A12	"		" "A" " "
A7	"	4300	" "C" Ant. "
A10	"		" "B" " "
A13	"		" "A" " "
A14	Padder	4301	" "A" Osc. "



DISASSEMBLY INSTRUCTIONS

1. Remove five push-on type control knobs from tuning chassis.
2. Remove antenna plug from rear of tuning chassis.
3. Remove phono-motor plug from rear of tuning chassis.
4. Remove antenna leads from terminal strip on loop antenna.
5. Remove phono-pickup plug from rear of tuning chassis.
6. Remove recorder chassis power supply plug from rear of tuning chassis.
7. Remove pilot light plug from rear of tuning chassis.
8. Remove speaker plugs from speaker.
9. Remove four machine screws holding tuning chassis in cabinet. Remove chassis from cabinet.
10. Remove four machine screws holding speaker in cabinet. Remove speaker from cabinet.
11. Remove two wood screws holding loop antenna in cabinet. Remove loop from cabinet.
12. Remove cutter cartridge pickup plug from recorder chassis.
13. Remove two push-on type control knobs from recording chassis.
14. Remove four Phillips head machine screws holding recorder chassis in cabinet. Remove chassis from cabinet.

DATE 11/48-#4820-9 SET #50-FOLDER #9



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION,
RADIO PHONO SWITCH IN RADIO POSITION
TUBES #7 & 8 TAKEN IN RECORD POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1			0V.	0V.	-.2VDC	0V.			
2				240VDC	90VDC	-12VDC			
3				0V.	-.2VDC	0V.			
4					-.2VDC	0V.			
5					50VDC	25VDC	0V.		
6					65VDC	25VDC			
7									
8									
9									
10									
11									
12									
13									
14							310VAC	100VDC	

TAKEN WITH VACUUM TUBE VOLTMETER

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1									
2									
3									
4			1 MEG.						
5				100KΩ					
6				150KΩ					
7				4.7KΩ					
8			1 MEG.						
9	6U5/6G5								
10	6K6GT					470KΩ			
11						470K			
12						470KΩ			
13						470KΩ			
14									

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY
ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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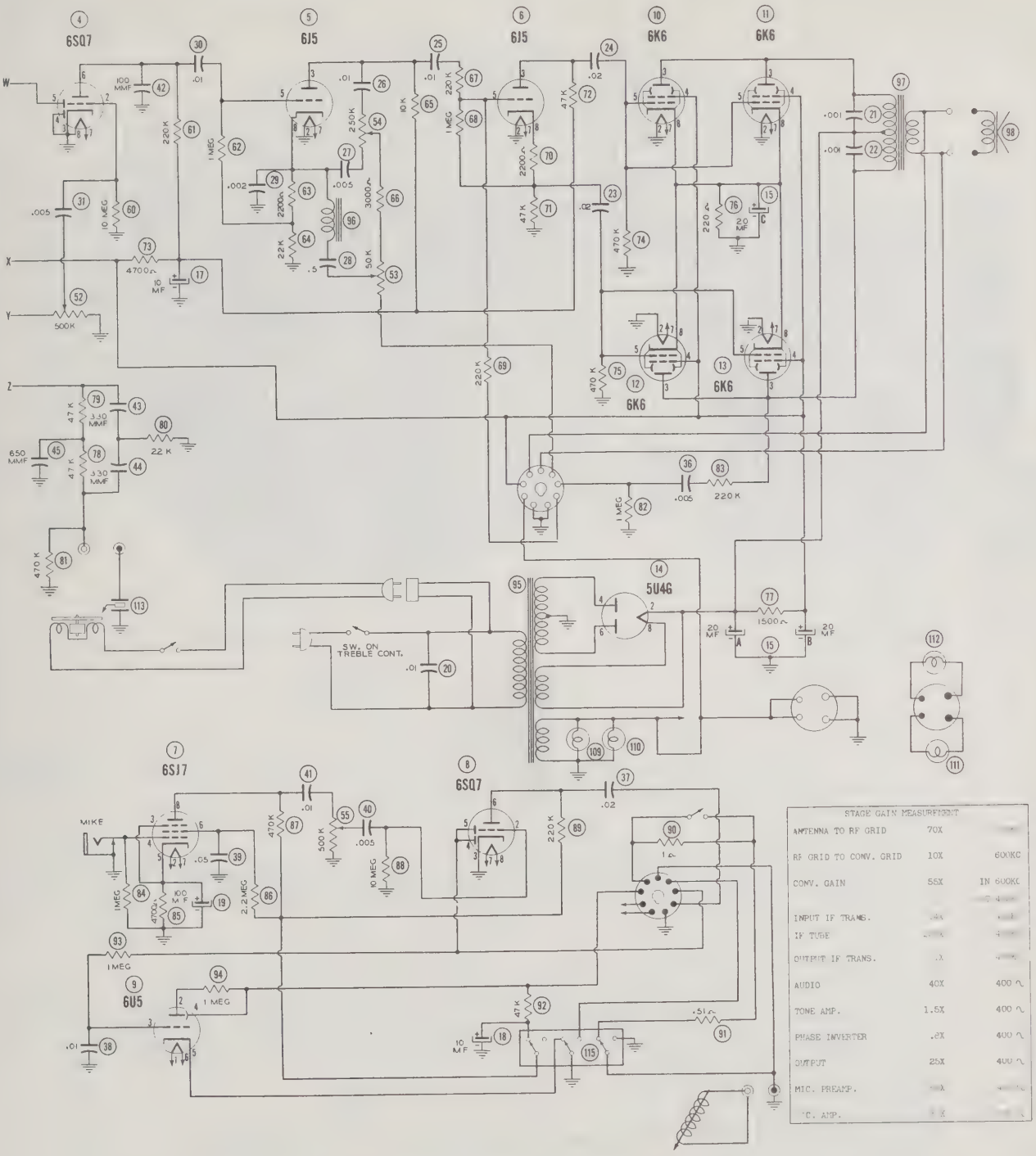

THE COOPERATION OF THE MANUFACTURER OF THIS
RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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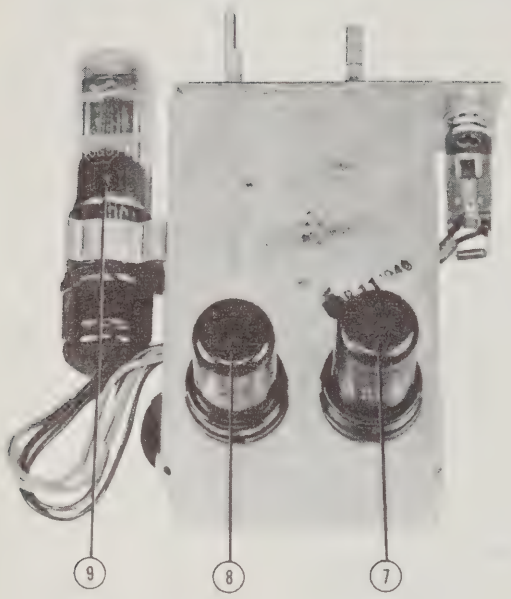
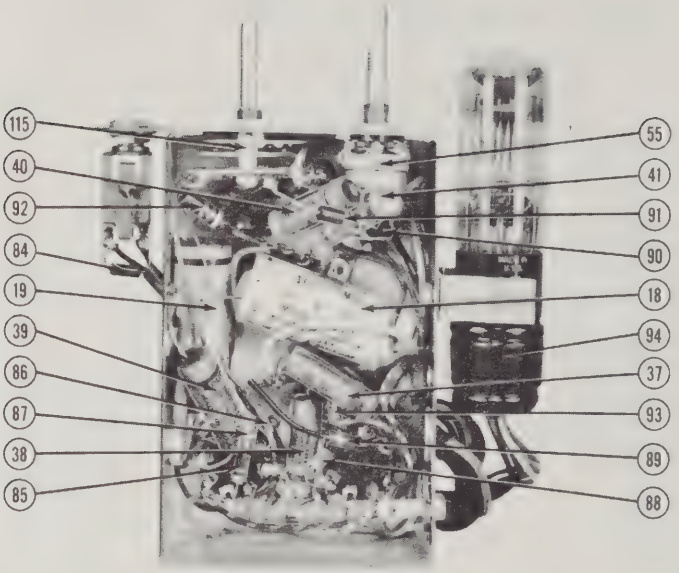


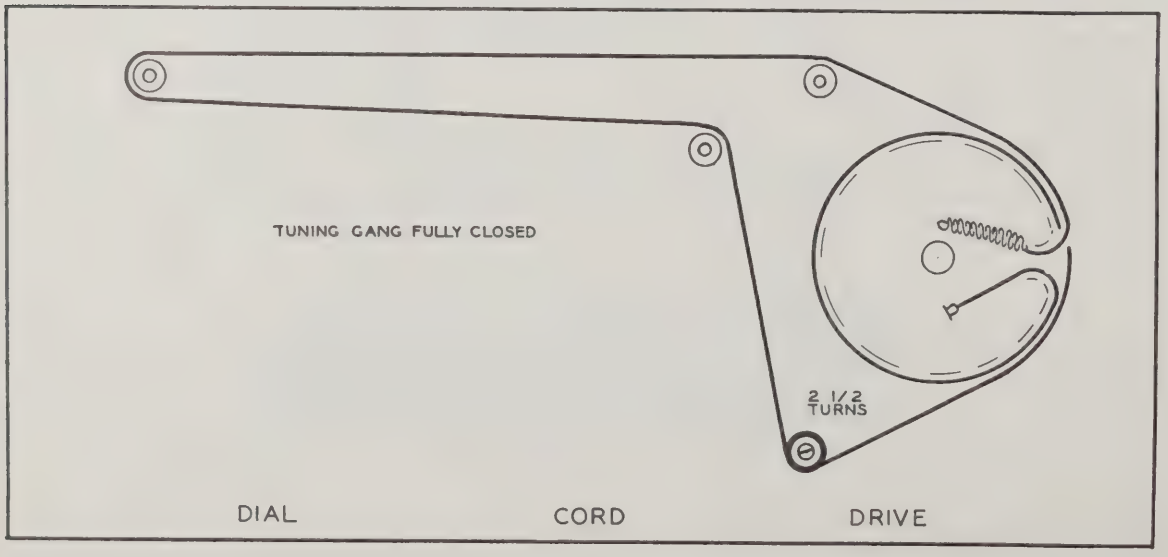


PUSHBUTTON ADJUSTMENTS

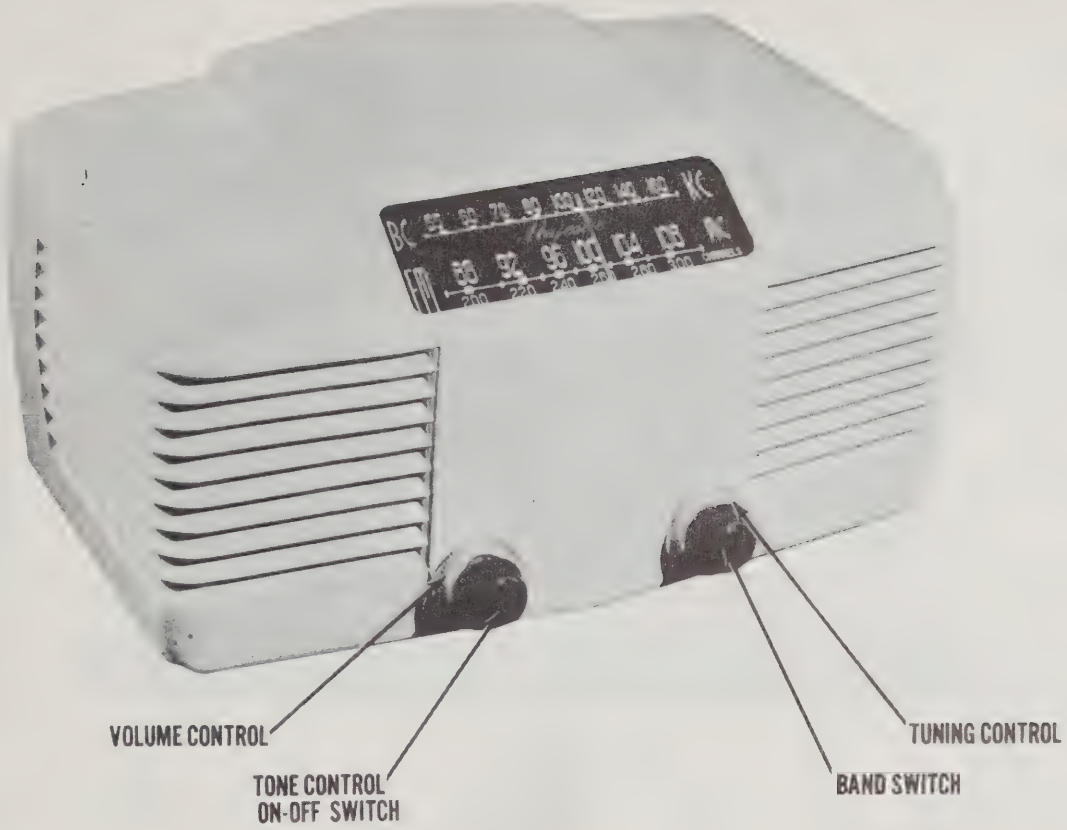
The frequency ranges of the pushbuttons in order from left to right are:

550-890KC, 550-890KC, 890-1570KC, 890-1570KC and 1000-1740KC.

1. Turn set on and allow it to warm up for at least fifteen minutes.
2. Make up a list of stations desired to be set up ranging from low to high freq. stations making sure that each station falls within the frequency range of its station.
3. Depress dial button and manually tune in first station to be set up.
4. Depress first button on left and adjust B1 for desired station.
5. Adjust B2 for maximum volume.
6. Repeat Steps 5 & 6 until no further improvement can be made.
7. To set up the remaining buttons follow the procedure outlined above.



MAJESTIC MODEL
6FM714 (Ch. 6B02D)



MAJESTIC MODEL
6FM714 (Ch. 6B02D)

MAJESTIC MODEL 6FM714

TRADE NAME	Majestic, Model 6FM714 (Ch. 6B02D)
MANUFACTURER	Majestic Radio & Tele. Corp., Elgin, Ill.
TYPE SET	AC-DC Operated FM-AM Superheterouyne Receiver with Loop Antenna
TUBES (SIX)	Types, 12AT7 FM Converter, 12BE6 AM Converter, 12SK7GT IF Amp., 12SQ7GT Det.-AVC-AF, 35L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC — RATING .24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1610KC — **SHORT WAVE** 88-108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to ext. AM ant. terminal. Low side to B-.	455KC	AM (Counter clock-wise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2		Loop	1500KC	"	1500KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	"	"	Tune for maximum output.	"	A6	Rock tuning cap. and adjust for maximum output.
4	300Ω carbon res.	High side to ext. FM ant. terminal "dipole". Low side to ant. terminal "FM". (Line ant. disconnected)	19MC (Unmodulated)	FM (Clock-wise)	Tuning cap. fully open.	"	A7	Adjust for minimum output
5	"	"	104MC (Unmodulated)	"	104MC	"	A8	" " " "
6	"	"	"	"	Tune for minimum output.	"	A9	Rock tuning cap. and adjust for minimum output.

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DATE 11/48-#4820-10 SET #50-FOLDER #10

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MAJESTIC PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM Converter	12AT7	12AT7		
2	AM Converter	12BE6	12BE6	7CH	
3	IF Amp.	12SK7GT	12SK7GT	6N	
4	Det.-AVC-AF	12SQ7GT	12SQ7GT	6Q	
5	Power Output	35L6GT	35L6GT	7AC	
6	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MAJESTIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	40	150	19-59	AF1010D4A‡	UP7DJ63	DY-3x40-150#	BL340#	◓ Filter
B	40	150						▲ "
C	40	150						■ Decoupling
D	100	10		PRS25/100		M-100-12	UHC-112	Cathode Bypass
8	10	25	19-58	PRS25/10	BR102A	M-10-25	TA-10	Stabilizing Cap.
9	.05	400	016-8	484-05	DT4S5	ST-4-05	TC-15	Line Filter
10	.2	200	5-51	484-.2	DT4P2	ST-4-2	72P3	Line Isolation
11	.01	400	016-5	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
12	.02	200	015-6	484-02	DT2S2	ST-4-02	TC-12	" "
13	.005	600	017-4	684-005	DT6D5	ST-6-005	TC-25	Tone Compensation
14	.01	400	016-5	484-01	DT4S1	ST-4-01	TC-11	" "
15	.05	200	015-8	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
16	1000	300	4-6	1468-001	1W5D1	MW.5-21	1FM-21	Rectifier Bypass
17	100	300	4-7	1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass
18A	10000	300	*	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
B	220	300		1468-0002	5W5T2	MO.5-32		AF Plate Bypass
19	220	500	02-053	1468-0002	5W5T2	MO.5-32		Diode RF Filter
20	1000	300	4-6	1468-001	1W5D1	MW.5-21	1FM-21	Screen Decoupling
21	15	300	6-8?				MS-415	Fixed Trimmer
22	1000	300	4-6	1468-001	1W5D1	MW.5-21	1FM-21	De-emphasis
23	700	500	6-228	1468-00075	1W5T7	MO.5-37	1FM-37	RF Bypass Pwr. Supply
24	5000	300	4-4	1467-005	1D5D5	MW.5-25	1FM-25	RF Bypass
25	3300	500	021-38	1467-003	1W5D3	MW.5-23	1FM-23	Quench Network
26	30	300	4-5		5R5Q3	MOS.5-43	MS-43	Regen. Feedback
27	30	300	4-5		5R5Q3	MOS.5-43	MS-43	" "
28	30	300	4-5		5R5Q3	MOS.5-43	MS-43	Osc. Grid Cap.
29	68	300	4-8					Fixed Padder
30	470	500	020-67	1468-0005	5W5T5	MO.5-35	1FM-35	RF Bypass
31	470	500	020-67	1468-0005	5W5T5	MO.5-35	1FM-35	" "
32	1000	300	4-6	1468-001	1W5D1	MW.5-21	1FM-21	" "
33	2.2	300	6-134					Osc. Coupling
34	2.2	300	6-134					FM Ant. Coupling
35	1000	300	4-6	1468-001	1W5D1	MW.5-21	1FM-21	FM Ant. Isolation
36	1000	300	4-6	1468-001	1W5D1	MW.5-21	1FM-21	FM Line Ant. Coupling

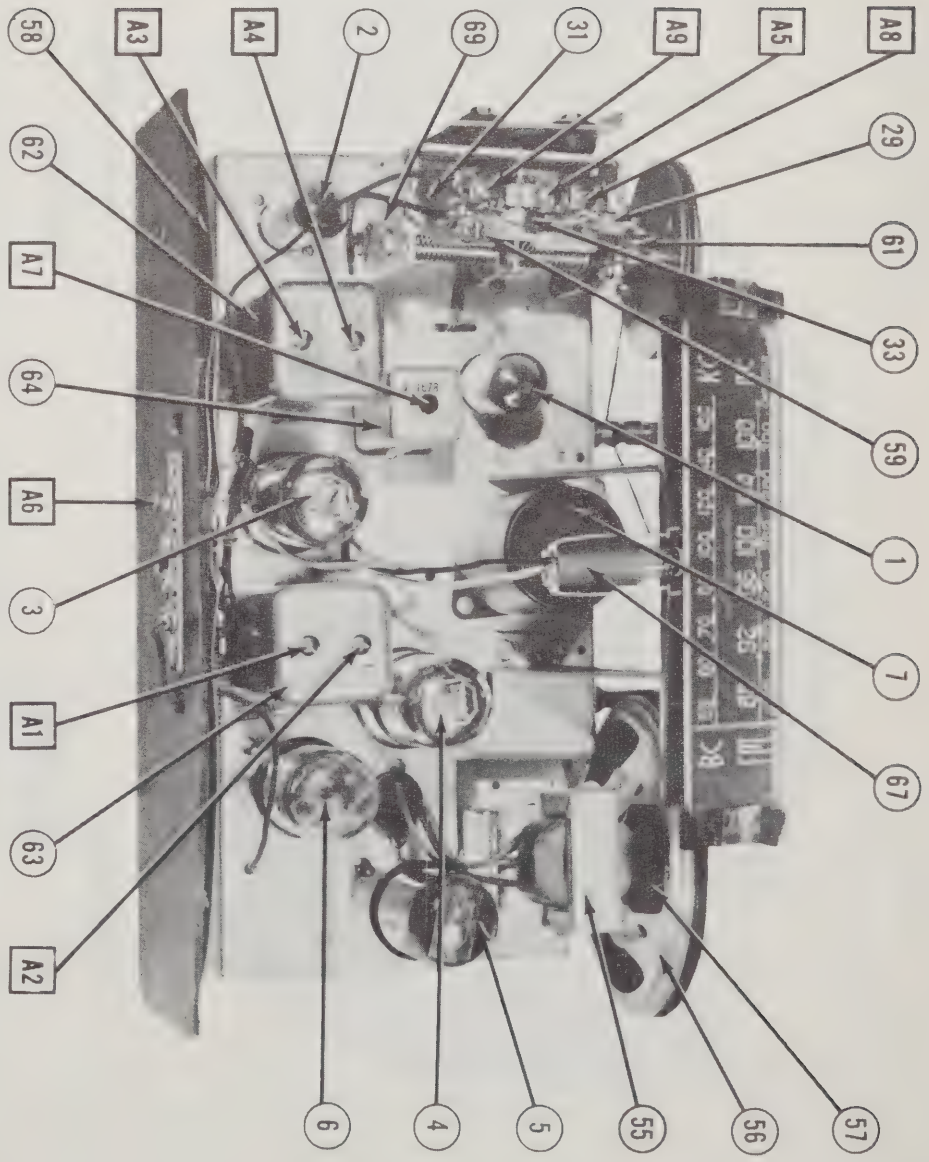
‡Omit bypass section.
#Install new mounting socket.
*Items 18A & B and 51A & B are combined in one unit, obtainable under manufacturers Part #37-1.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MAJESTIC PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
37A	2 Meg.	½	13-30			Volume Control tapped @ 100KΩ
B	500KΩ	½				Tone Control & Switch

This is a dual control with a concentric shaft.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MAJESTIC PART No.	IRC PART No.	
38	33KΩ	½	02-150	BTS-33K	Or.-Or.-Or. FM Oscillator Grid
39	150KΩ	½	02-178	BTS-150K	Br.-Grn.-Yl. Voltage Dropping
40	100KΩ	½	02-171	BTS-100K	Br.-Blk.-Yl. De-emphasis
41	1500Ω	½	02-94	BTS-1500	Br.-Grn.-Red Quench Network
42	22KΩ	½	02-143	BTS-22K	Red-Red-Or. FM Converter Cathode
43	22KΩ	½	02-143	BTS-22K	Red-Red-Or. AM Oscillator Grid
44	3.3 Meg.	½	02-234	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
45	100KΩ	½	02-171	BTS-100K	Br.-Blk.-Yl. AM IF Transformer Shunt
46	1200Ω	1	03-90	BTA-1200	Br.-Red-Red Decoupling
47	22KΩ	½	02-143	BTS-22K	Red-Red-Or. Diode RF Filter
48	12KΩ	½	02-132	BTS-12K	Br.-Red-Or. Tone Compensation
49	5600Ω	½	02-118	BTS-5600	Grn.-Blue-Red " "
50	10 Meg.	½	02-255	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
51A	500KΩ	½	*	BTS-470K	AF Plate Load
B	500KΩ	½		BTS-470K	Output Grid
52	150Ω	½	02-52	BW-½-150	Br.-Grn.-Br. Output Cathode
53	1200Ω	1	03-90	BTA-1200	Br.-Red-Red Filter
54	22Ω	½	02-17	BW-½-22	Red-Red-Blk. Rectifier Ballast

Note-Items 18A, 18B, 51A & 51B are combined in one unit obtainable under Manufacturers Part #37-1.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MAJESTIC PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
55	4400Ω	3.3Ω	415Ω tapped @ 26Ω	.6Ω	Part of 22-N-39	A-3330§		A-3031§	§Bend mounting tabs down, file out slots and mount on original brackets.

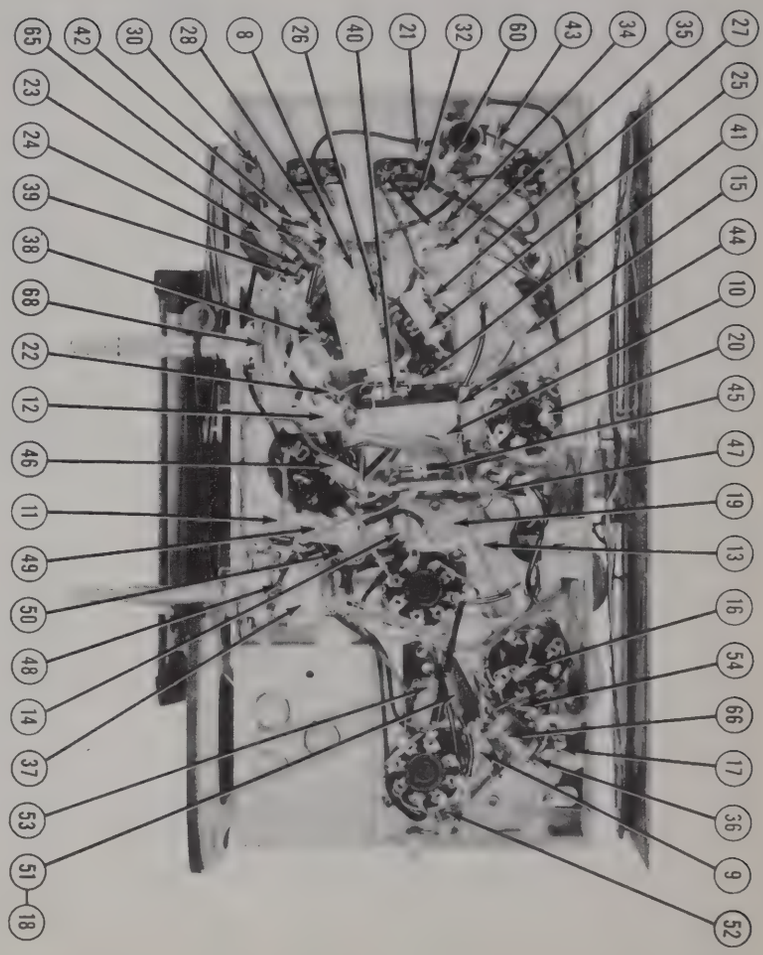
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			MAJESTIC PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-113†		†Fabricate new mounting bracket.
56	PM	3.3Ω	22-N-39	Mod. P-4X	4A15†	
	CONE DIA.	VC DIA.				
57	4"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	MAJESTIC PART No.	MEISSNER PART No.	
58	Loop Ant.	.2Ω	1.1Ω	S-1686		
59	FM Ant.Coil		0Ω	3-209		
60	Osc. Coil AM	1.2Ω	5.5Ω	S-1684	14-1060**	**Add 50 MMFD from high side tuning cap. to osc. grid.
61	" " FM		0Ω	3-208		
62	Input IF	12Ω	12Ω	3-116	16-6658	
63	Output IF	12Ω	12Ω	3-117	16-6660	
64	FM IF	1.6Ω	.5Ω	S-1678		
65	Osc. Cath. Choke		1.3Ω	S-1928		
66A	Line Choke		0Ω	S-1681		
B	" "		0Ω			

CHASSIS—BOTTOM VIEW



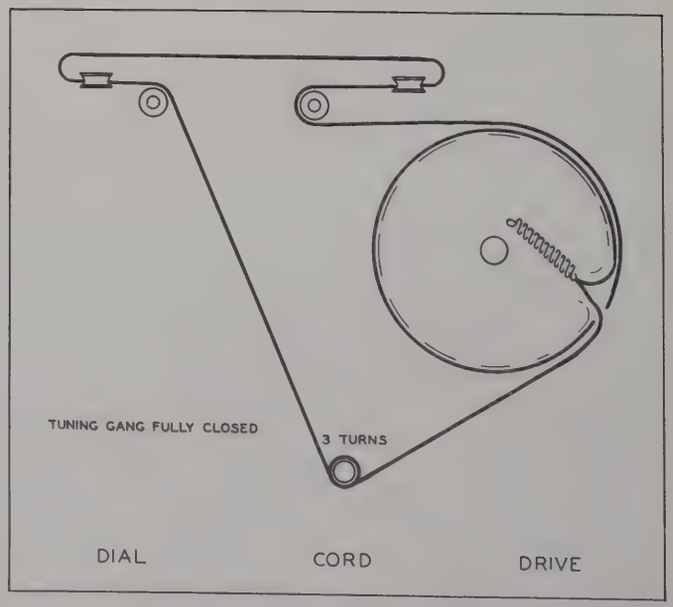
PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					MAJESTIC PART No.		
67	Bayonet	6-8	0.15	Brown	26-2		Type 47

MISCELLANEOUS

ITEM No.	PART NAME	MAJESTIC PART No.	NOTES
68	Switch	11-78	AM-FM
69	2 Gang Var. Cap.	7-33	AM (18-521MMF, 17-187MMF)
A6	Trimmer	8-59	BC Ant. Adj.
	Cabinet	116-12	(State Color)
	Dial Scale	117-96	
	Dial Pointer	135-23	



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
‡ 1	12AT7	100VDC	30VDC	50VDC	12VAC	0V.	100VDC	-2.2VDC	0V.	6.4VAC
2	12BE6	-6.8VDC§	0V.	26VAC	39VAC	90VDC	80VDC	-.1VDC	-	-
3	12SK7GT	0V.	39VAC	-.4VDC	-.1VDC	0V.	80VDC	80VAC	90VDC	-
4	12SQ7GT	0V.	-.3VDC	0V.	-1.1VDC	-1.1VDC	50VDC	26VAC	12VAC	-
5	35L6GT	0V.	50VAC	100VDC	90VDC	0V.	0V.	85VAC	5.9VDC	-
6	35Z5GT	0V.	117VAC	112VAC	0V.	109VAC	0V.	85VAC	120VDC	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

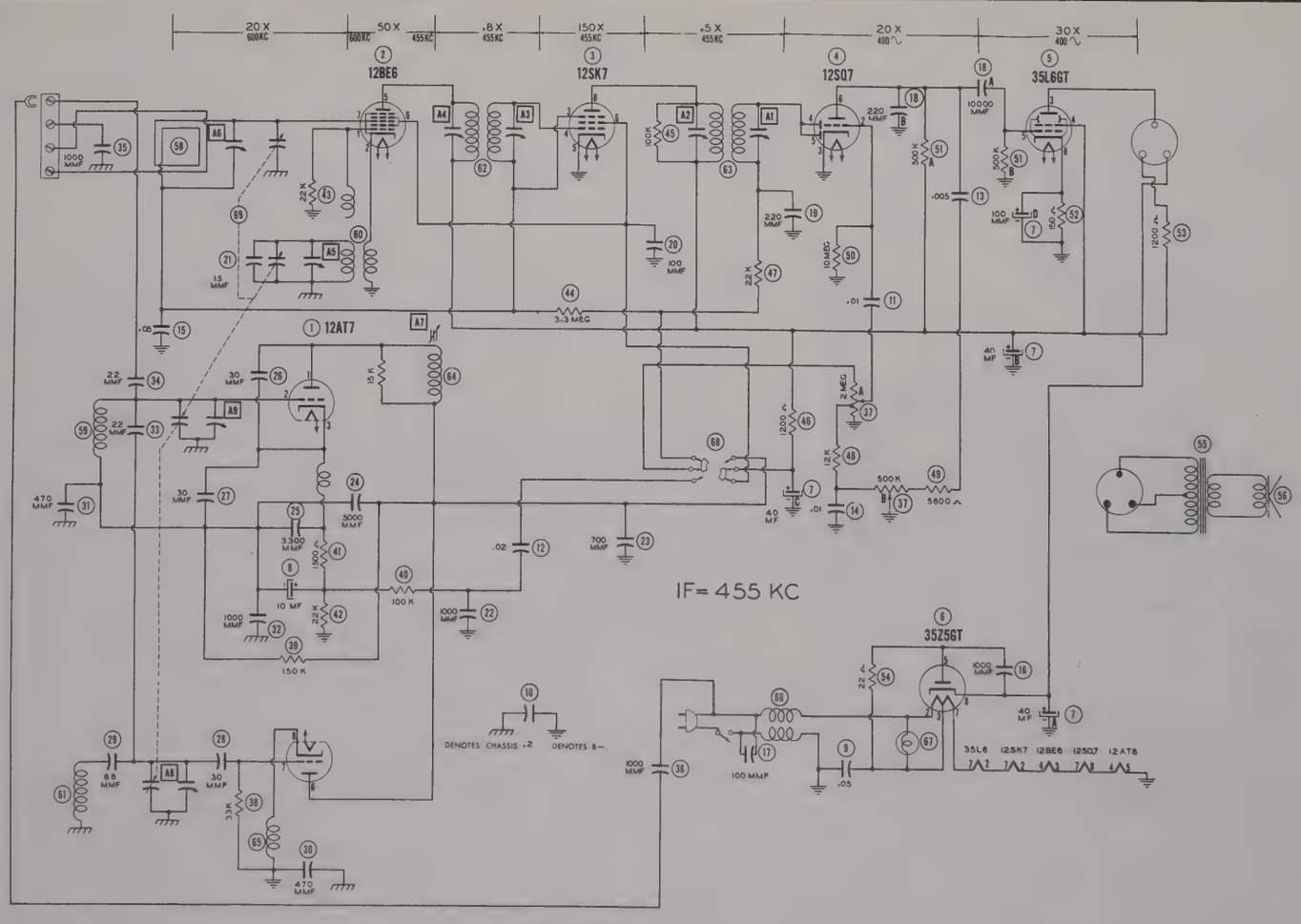
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
‡ 1	12AT7	180KΩ	330KΩ	25KΩ	11Ω	0Ω	180KΩ	33KΩ	1.3Ω	6Ω
2	35L6GT	INF.	52Ω	180KΩ	180KΩ	500KΩ	0Ω	85Ω	150Ω	-
3	12SQ7GT	INF.	10 Meg.	0Ω	520KΩ	520KΩ	700KΩ	25Ω	11Ω	-
4	12SK7GT	INF.	38Ω	3.8 Meg.	3.8 Meg.	0Ω	180KΩ	52Ω	180KΩ	-
5	12BE6	22KΩ	1.2Ω	25Ω	38Ω	180KΩ	180KΩ	3.8 Meg.	-	-
6	35Z5GT	INF.	107Ω	105Ω	INF.	130Ω	INF.	85Ω	180KΩ	-

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

DATE 11/48-#4820-10 SET #50-FOLDER #10



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4820-10

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

MASCO MODEL MA-17N

TRADE NAME	Masco, Models MA-17N, MA-17PN
MANUFACTURER	Mark Simpson Mfg. Co., Inc., 32-28 49th St., Long Island City 3, N.Y.
TYPE SET	AC Operated 3 Channel Audio Amplifier
TUBES (SIX)	Types, 6SC7 Mic. Amp., 6SJ7 Mixer, 6SL7 AF-Phase Inverter, (2) 6L6G Power Output, 5V4G Rectifier.
POWER SUPPLY	105-125 Volts AC RATING .9 Amp. @ 117 Volts AC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SC7	0V.	55VDC	-.4VDC	-.4VDC	55VDC	0V.	3.2VAC	3.2VAC
2	6SJ7	0V.	3.2VAC	1.2VDC	0V.	1.2VDC	40VDC	3.2VAC	70VDC
3	6SL7	0V.	120VDC	1VDC	0V.	120VDC	1VDC	3.2VAC	3.2VAC
4	6L6GT	0V.	3.2VAC	280VDC	260VDC	0V.	120VDC	3.2VAC	16.5VDC
5	6L6G	0V.	3.2VAC	280VDC	260VDC	0V.	0V.	3.2VAC	16.5VDC
6	5V4G	0V.	280VDC	0V.	275VAC	0V.	275VAC	0V.	280VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SC7	0Ω	400KΩ	5.6 Meg.	5.6 Meg.	400KΩ	0Ω	25Ω	25Ω
2	6SJ7	0Ω	25Ω	1KΩ	100KΩ	1KΩ	570KΩ	25Ω	200KΩ
3	6SL7	10KΩ	170KΩ	1KΩ	30KΩ	170KΩ	1KΩ	25Ω	25Ω
4	6L6G	0Ω	25Ω	60KΩ	65KΩ	280KΩ	175KΩ	25Ω	125Ω
5	6L6G	0Ω	25Ω	60KΩ	65KΩ	270KΩ	10KΩ	25Ω	125Ω
6	5V4G	INF.	60KΩ	INF.	40Ω	INF.	43Ω	INF.	60KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper ouptut load connected.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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MASCO MODELS
MA-17N, MA-17PN

MASCO MODELS
MA-17N, MA-17PN

PARTS LIST AND DESCRIPTIONS

MASCO MODELS
MA-17N, MA-17PN

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MASCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Mic. Amp.		6SC7	8S	
2	Mixer		6SJ7	8N	
3	AF-Phase Inv.		6SL7	8BD	
4	Power Output		6L6G	7AC	
5	" "		6L6G	7AC	
6	Rectifier		5V4G	5L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MASCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7	16	450		PRS450/16	BR1645	M-16-450	UT-16	Filter
8	16	450		PRS450/16	BR1645	M-16-450	UT-16	"
9A	8	450		PRSA450/8-8	EDL8845	DH-2x8-450	UT-88	Decoupling
B	8	450						"
10	8	450		PRS450-8	BR645	M-8-450	UT-8	"
11	50	50		PRS50-50	BR505	M-50-50	TA-550	Output Cathode Bypass
12	50	50		PRS50-50	BR505	M-50-50	TA-550	AF Cathode Bypass
13	.1	600		684-.1	GT6P1	ST-6-1	TC-1	Audio Coupling
14	.1	600		684-.1	GT6P1	ST-6-1	TC-1	" "
15	.1	600		684-.1	GT6P1	ST-6-1	TC-1	" "
16	.005	600		684-005	GT6D5	ST-6-005	TC-25	Tone Compensation
17	.1	600		684-.1	GT6P1	ST-6-1	TC-1	AF Screen Bypass
18	.01	600		684-01	GT6S1	ST-6-01	TC-11	Audio Coupling
19	.01	600		684-01	GT6S1	ST-6-01	TC-11	" "
20	.005	600		684-005	GT6D5	ST-6-005	TC-25	" "
21	.005	600		684-005	GT6D5	ST-6-005	TC-25	" "
22	500	500		1468-0005	5W5T5	MO.5-35	1FM-35	Output Grid Bypass
23	500	500		1468-0005	5W5T5	MO.5-35	1FM-35	Tone Compensation
24	500	500		1468-0005	5W5T5	MO.5-35	1FM-35	" "

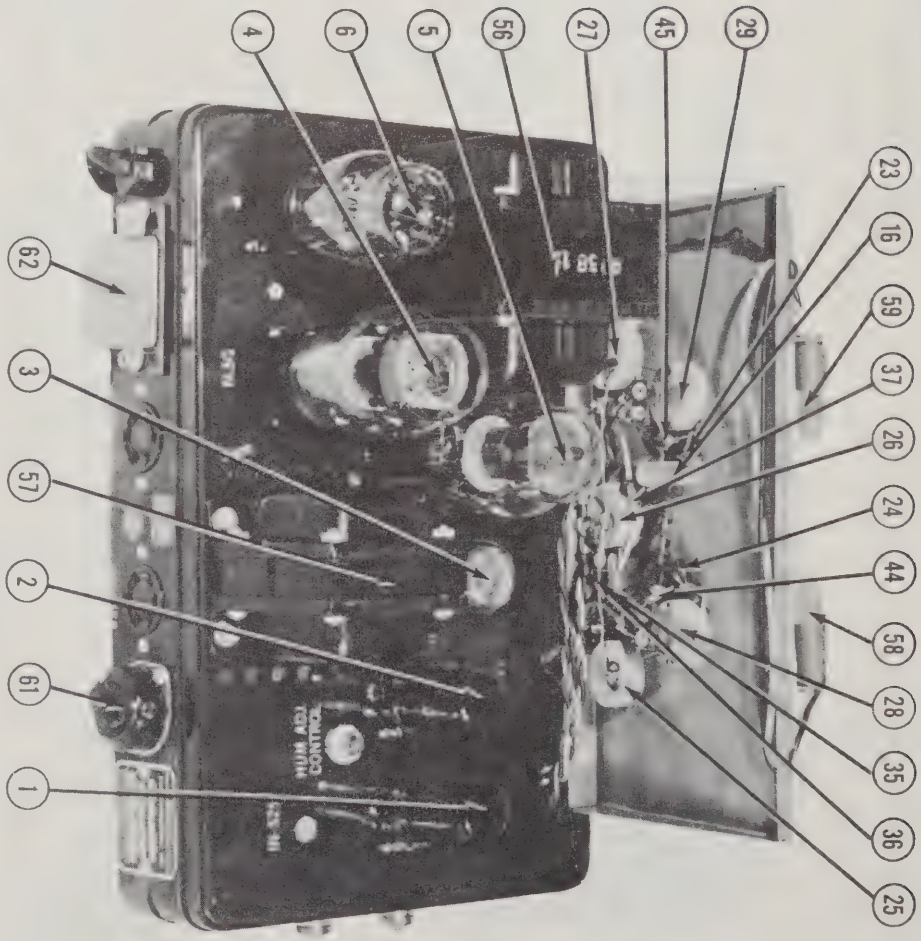
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MASCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
25A	500KΩ	½		D13-133	M-60-Z	Mike 1 Control
B	Shaft			A	Not Req.	Attach to 25A per instructions
26A	500KΩ	½		D13-133	M-60-Z	Mike 2 Control
B	Shaft			A	Not Req.	Attach to 26A per instructions
27A	500KΩ	½		D13-133	M-60-Z	Phono Control
B	Shaft			A	Not Req.	Attach to 27A per instructions
28A	500KΩ	½		D13-133	M-60-Z	Bass Control
B	Shaft			A	Not Req.	Attach to 28A per instructions
29A	500KΩ	½		D13-133	M-60-Z	Treble Control
B	Shaft			A	Not Req.	Attach to 29A per instructions
30	50Ω	1		W-50	43-50	Hum Balance Control

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MASCO PART No.	IRC PART No.	IDENTIFICATION CODES
31	5.6 Meg.	½		BTS-5.6 Meg.	Grn.-Blue-Grn. 1st Mic. Amp. Grid
32	5.6 Meg.	½		BTS-5.6 Meg.	Grn.-Blue-Grn. 2nd Mic. Amp. Grid
33	270KΩ	½		BTS-270K	Red-Vi.-Yl. 1st Mic. Amp. Plate Load
34	270KΩ	½		BTS-270K	Red-Vi.-Yl. 2nd Mic. Amp. Plate Load
35	270KΩ	½		BTS-270K	Red-Vi.-Yl. Isolation
36	270KΩ	½		BTS-270K	Red-Vi.-Yl. "
37	270KΩ	½		BTS-270K	Red-Vi.-Yl. "
38	27KΩ	½		BTS-27K	Red-Vi.-Or. Decoupling
39	27KΩ	½		BTS-27K	Red-Vi.-Or. "
40	10KΩ	½		BTS-10K	Br.-Blk.-Or. "
41	1000Ω	½		BTS-1000	Br.-Blk.-Red Mixer Cathode
42	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Mixer Screen Dropping
43	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Mixer Plate Load

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MASCO PART No.	IRC PART No.	
44	270KΩ	½		BTS-270K	Red-Vi.-Yl. Tone Compensation
45	27KΩ	½		BTS-27K	Red-Vi.-Or. " "
46	1000Ω	½		BTS-1000	Br.-Blk.-Red AF Cathode
47	100KΩ	½		BTS-100K	Br.-Blk.-Yl. AF Plate Load
48	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Phase Inverter Plate Load
49	1000Ω	½		BTS-1000	Br.-Blk.-Red Phase Inverter Cathode
50	10KΩ	½		BTS-10K	Br.-Blk.-Or. Phase Inverter Grid
51	270KΩ	½		BTS-270K	Red-Vi.-Yl. Output Grid
52	270KΩ	½		BTS-270K	Red-Vi.-Yl. " "
53	125Ω	10		DHA-150	Output Cathode-See Note
54	15KΩ	2		BTS-15K	Br.-Grn.-Or. Feedback
55	2500Ω	10		AB-2500	Filter

Note-On IRC replacement set slider at 125Ω from one end.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	MASCO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
56	125V AC tapped @ 117 V AC @ .9A	550V CT .145A DC	5.2V AC @ 2.0A	6.4V AC @ 1.9A	P-17	P-6143#†	T22R32†	

#Drill new mounting holes. †Add series resistor to reduce plate voltage.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MASCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
57	5000Ω CT	4Ω 8Ω 15Ω 125Ω 250Ω 500Ω	110Ω CT	.4Ω .6Ω .8Ω 14Ω 20Ω 29Ω	T-17A	A-3800#	T22S70	A-3131#	#Drill new mounting hole.

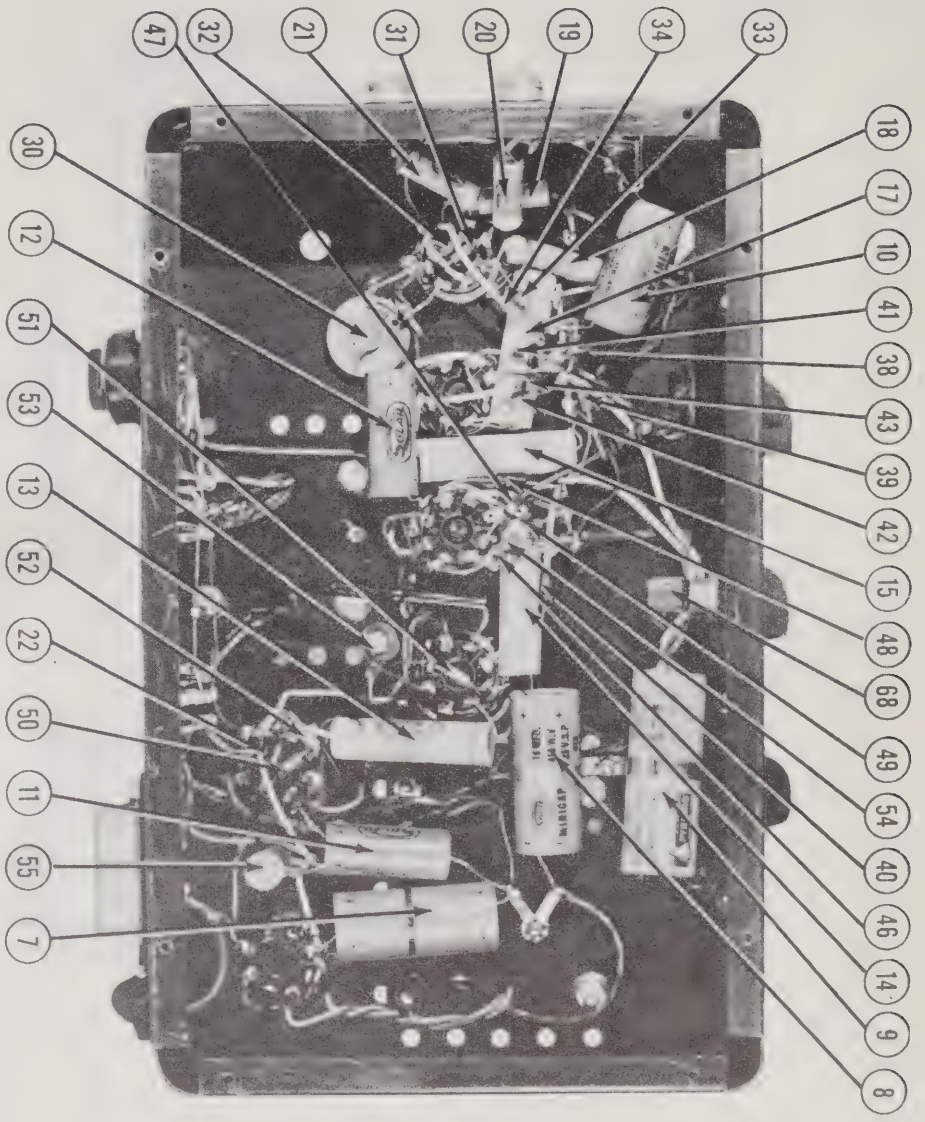
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					MASCO PART No.		
58	Bayonet	6-8	0.25	Blue			Type 44
59	"	"	"	"			" "

MISCELLANEOUS

ITEM No.	PART NAME	MASCO PART No.	NOTES
60	Switch		On-Off
61	"		Impedence Selector
62	Fuse		1.5 Amp. (3AG)

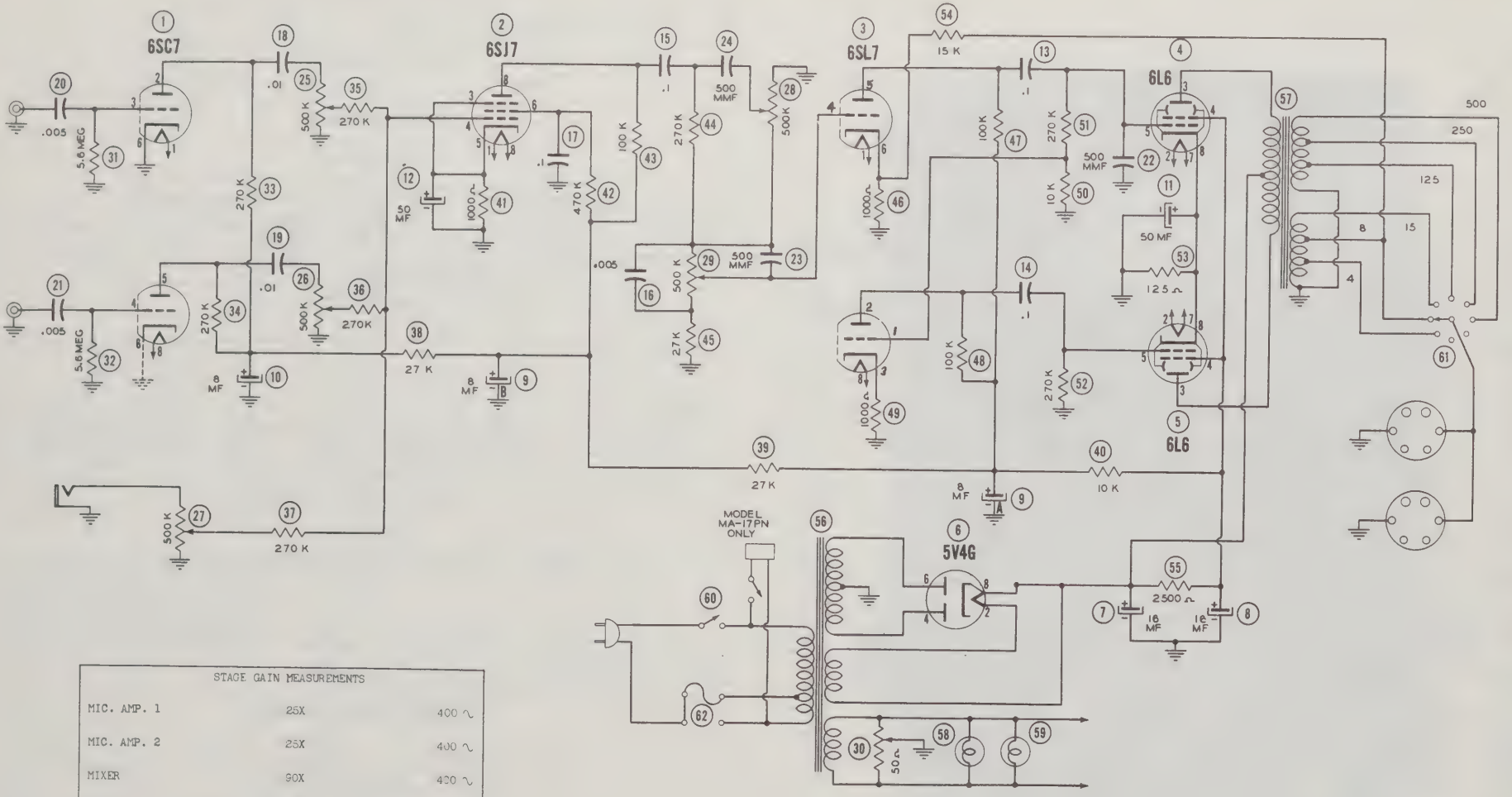
CHASSIS—BOTTOM VIEW



DATE 11/48-#4820-11 SET #50-FOLDER #11

MASCO MODELS MA-17N, MA-17PM

MASCO MODELS MA-17N, MA-17PM



STAGE GAIN MEASUREMENTS		
MIC. AMP. 1	25X	400 ~
MIC. AMP. 2	25X	400 ~
MIXER	90X	400 ~
AF AMP.	.8X	400 ~
OUTPUT	15X	400 ~

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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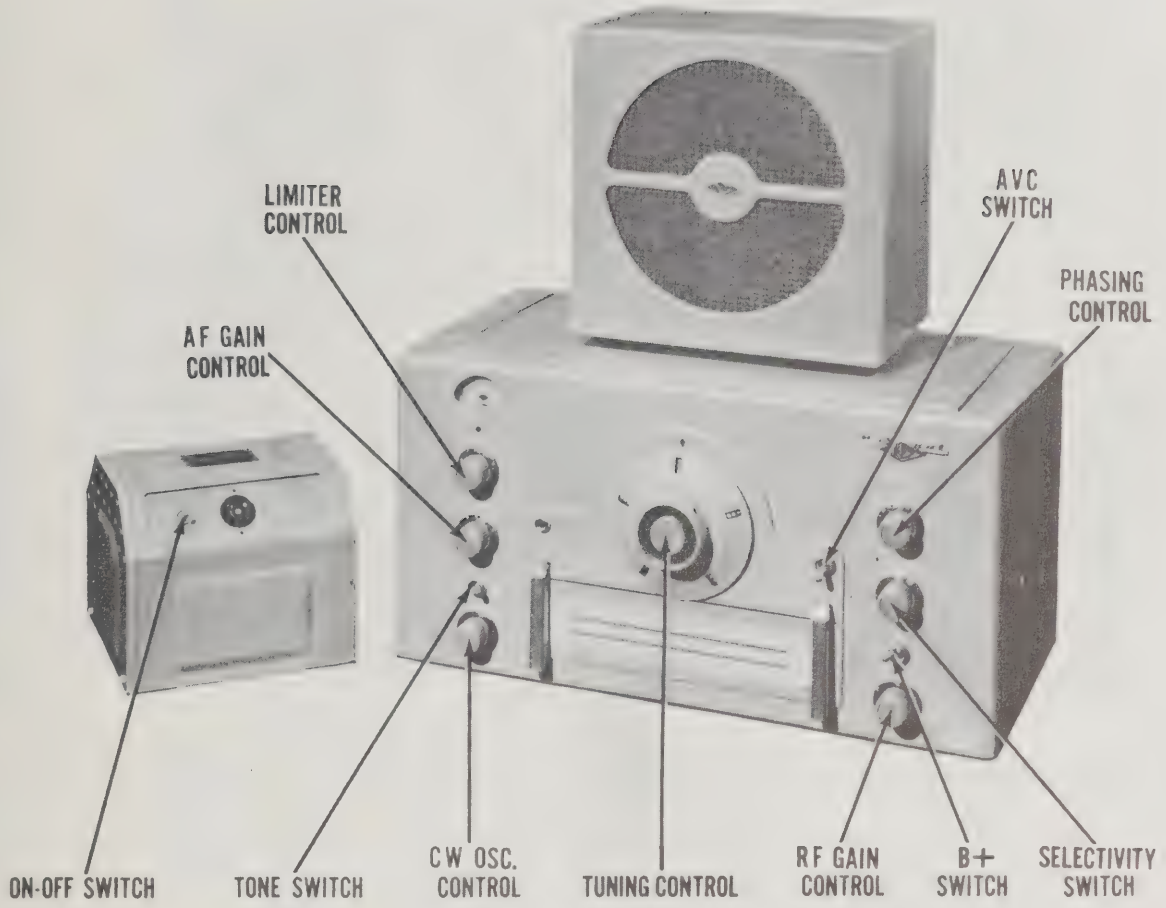
NATIONAL MODELS
HRO-7R, HRO-7T



NATIONAL MODELS
HRO-7R, HRO-7T

NATIONAL MODEL HRO-7T

TRADE NAME	National, Models HRO-7R, HRO-7T
MANUFACTURER	National Co., Inc., 61 Sherman St., Malden, Mass.
TYPE SET	AC or Battery Operated Commercial Type Multi-Band Superheterodyne Receiver
TUBES (THIRTEEN)	Types, 6K7 1st RF Amp., 6K7 2nd RF Amp., 6J7 Mixer, 6C4 Oscillator, 6J7 or 6K7 1st IF Amp., 6K7 2nd IF Amp., 6H6 Det.-AVC, 6J7 BFO, 6H6 Noise Limiter, 6SJ7 AF Amp., 6V6GT Power Output, 0A2 Voltage Regulator, 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts AC, 220-240 Volts AC (697 Power Unit) or 6 Volt Storage Battery (686S Power Unit).
TUNING RANGE -	Band "A"-14.0-30.0MC, Band "B"-7.0-14.4MC, Band "C"-3.5-7.3MC, Band "D"-1.7-4.0MC (Following Bands available if desired) Band "E"-900-2050KC, Band "F"-480-960KC, Band "G"-180-430KC, Band "H"-100-200KC, Band "J"-50-100KC.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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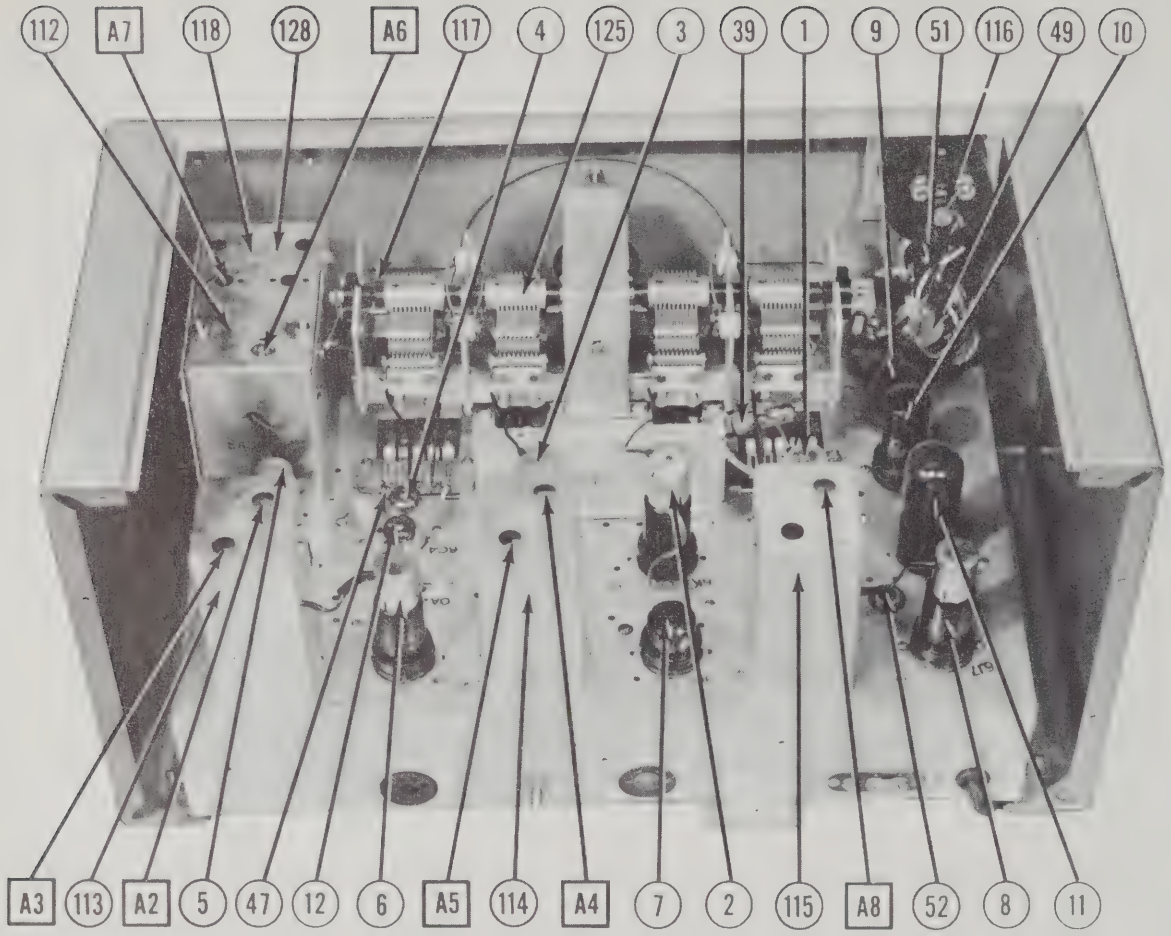
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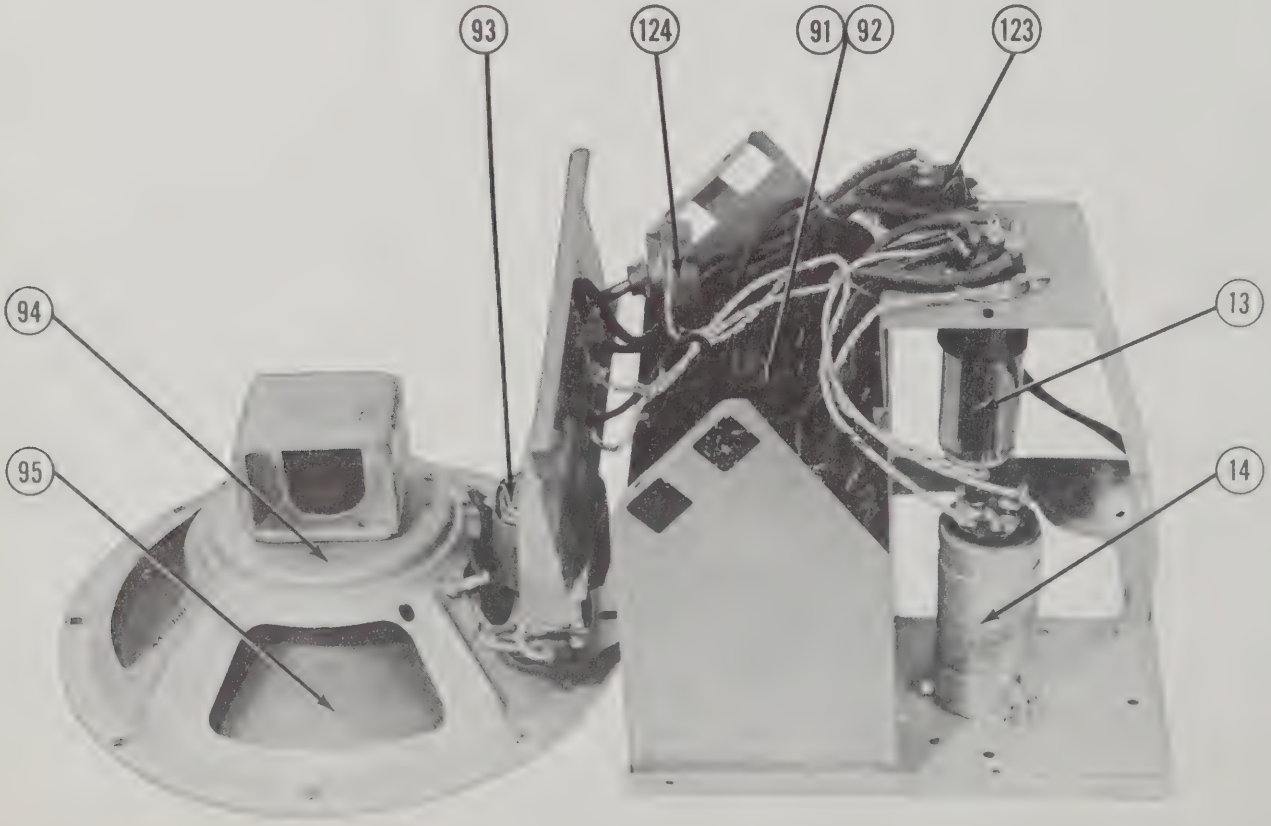
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	1st RF Amp.	6K7	6K7	7R	
2	2nd RF Amp.	6K7	6K7	7R	
3	Mixer	6J7	6J7	7R	
4	Oscillator	6C4	6C4	6BG	
5	1st IF Amp.	6J7	6J7	7R	6K7 Alternate
6	2nd IF Amp.	6K7	6K7	7R	
7	Det.-AVC	6H6	6H6	7Q	
8	Beat Freq. Osc.	6J7	6J7	7R	
9	Noise Limiter	6H6	6H6	7Q	
10	AF Amp.	6SJ7	6SJ7	8N	
11	Power Output	6V6GT	6V6GT	7AC	
12	Voltage Reg.	0A2	0A2	5BO	
13	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: NATIONAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
14A	8	475		E450-8-16	UP111145†	D1-3x8-450#	D9059	Filter
B	8	475						"
C	8	475						"
15	10	50		PRS50/10	BR105	M-10-50	TA-510	Output Cathode Bypass
16	25	50		PRS50/25	BR255	M-25-50	TA-525	AF Cathode Bypass
17	.01	600		684-01	DT6S1	ST-6-01	TC-11	RF Bypass Pwr. Supply
18	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Audio Coupling
19	.1	400		484-.1	DT4P1	ST-4-1	TC-1	AF Plate Decoupling
20	.1	400		484-.1	DT4P1	ST-4-1	TC-1	AF Screen Bypass
21	.01	600		684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
22	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Limiter Filter
23	.1	400		484-.1	DT4P1	ST-4-1	TC-1	" "
24	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Audio Coupling
25	.01	600		684-01	DT6S1	ST-6-01	TC-11	BFO Screen Bypass
26	.1	400		484-.1	DT4P1	ST-4-.1	TC-1	2nd IF Cath. Bypass
27	.01	600		684-01	DT6S1	ST-6-01	TC-11	AVC Filter
28	.1	400		484-.1	DT4P1	ST-4-1	TC-1	1st IF Cathode Bypass
29	.01	600		684-01	DT6S1	ST-6-01	TC-11	AVC Filter
30	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Osc. Plate Bypass
31	.01	600		684-01	DT6S1	ST-6-01	TC-11	Osc. Coupling
32	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Mixer Cathode Bypass
33	.1	600		684-.1	DT6P1	ST-6-.1	TC-1	RF Byp. Pwr. Supply
34	.1	400		484-.1	DT4P1	ST-4-1	TC-1	2nd RF Cath. Byp.
35	.01	600		684-01	DT6S1	ST-6-01	TC-11	AVC Filter
36	.1	600		684-.1	DT6P1	ST-6-1	TC-1	RF Byp. Pwr. Supply
37	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Screen Bypass
38	.1	400		484-.1	DT4P1	ST-4-1	TC-1	1st RF Cath. Byp.
39	.01	600		684-01	DT6S1	ST-6-01	TC-11	AVC Filter
40	.01	600		684-01	DT6S1	ST-6-01	TC-11	" "
41	.25	600		684-.25	DT6P25	ST-6-25	TC-2	IF Plate Decoup.
42	3300	600		1467-003	1W5D3	MW.5-23	1FM-23	Tone Compensation
43	3	500						BFO Coupling-Cer.
44	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	IF Coupling-Cer.
45	270	500		1468-00025	5W5T25	MO.5-325	1FM-325	Diode Filter-Cer.
46	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.-Cer.
47	10	500						Osc. Comp.-Cer.-Note 1
48	160	500		1468-00015	5W5T15	MO.5-315	1FM-315	Output Grid Byp.-Cer.
127	1	400		484-.1	DT4P1	ST-4-.1	TC-1	Screen Bypass-Note 2

#Parallel sections to obtain desired capacity.
†Omit one section.
Note1-Special tolerance-(minus .00077 mmf./mmf./°C)
Note2-Not used in all models.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: NATIONAL PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
93	2500Ω	3.2Ω	217Ω	.6Ω		A-3325	T22S60	A-2902	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: NATIONAL PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.				
94	PM	3.2Ω		ST-117 Mod. P3-T	8A31	
	CONE DIA.	VC DIA.				
95	7-3/4"	3/4"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: NATIONAL PART No.	MEISSNER PART No.
	Band				
96	Ant. Coil D	.6Ω	.9Ω		
97	" " C	.3Ω	.1Ω		
98	" " B	.2Ω	.1Ω		
99	" " A	.2Ω	.1Ω		
100	1st RF D	14Ω	.8Ω		
101	" " C	6.4Ω	.2Ω		
102	" " B	3.2Ω	.1Ω		
103	" " A	.9Ω	0Ω		
104	2nd RF D	13.8Ω	.9Ω		
105	" " C	6.3Ω	.2Ω		
106	" " B	.2Ω	0Ω		
107	" " A	.9Ω	0Ω		
108	Osc. Coil D		.8Ω		
109	" " C		.2Ω		
110	" " B		.1Ω		
111	" " A		0Ω		
112	1st IF	8Ω	9.5Ω		
113	2nd IF	8Ω	8Ω		
114	3rd IF	8.2Ω	8Ω		
115	BF Osc.				

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
116	Screw	6-8	0.15	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	NATIONAL PART No.	NOTES
117	Switch		AVC
118	"		Crystal Selectivity
119	"		B+
120	"		Tone
121	"		Radio-Phono
122	"		CW Osc.
123	"		115-230 Volt
124	"		Power
125	4 Gang Var. Cap.		(13-231MMF) each section
126	BFO Tuning Cap.		
128	Crystal Resonator		

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	NATIONAL PART No.	IRC PART No.	CLAROSTAT PART No.	
49A	500KΩ	½		D13-133	M-60-Z	AF Gain Control
B	Shaft			A	Not Req.	Attach to 49A per instructions
50	10KΩ	1.5		W-10K*	43-10K*	RF Gain Control & "S" Meter Sw.
51	500KΩ	½				Limiter Control & Sw.
52	1000Ω	1		W-1000	43-1000	"S" Meter Control

*Use center & right hand terminals only.

RESISTORS

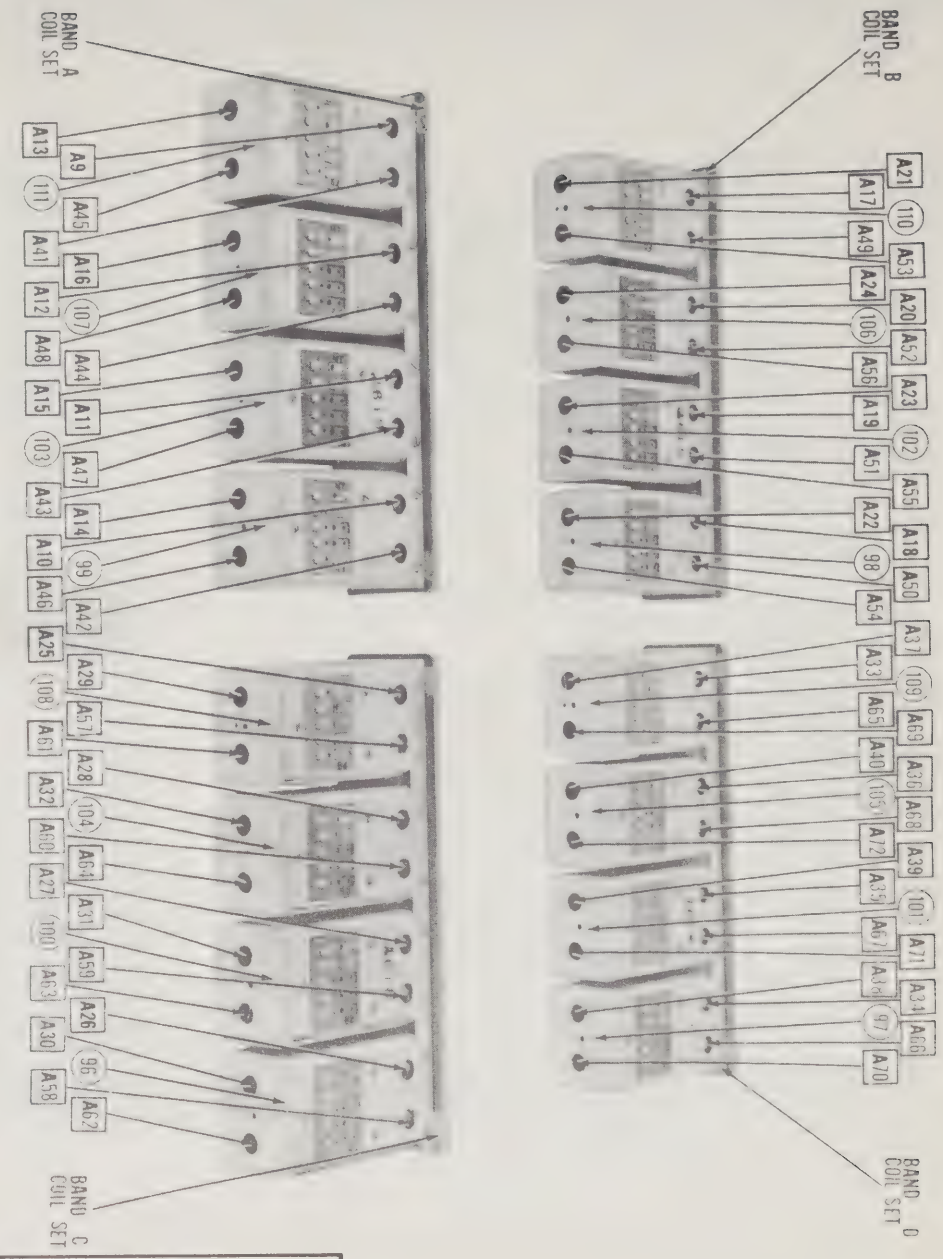
ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	NATIONAL PART No.	IRC PART No.	
53	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AVC Network
54	330Ω	½			Or.-Or.-Br. 1st RF Cathode
55	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AVC Network
56	330Ω	½			Or.-Or.-Br. 2nd RF Cathode
57	4700Ω	½		BTS-4700	Yl.-Vi.-Red Mixer Cathode
58	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Mixer Screen
59	22KΩ	½		BTS-22K	Red-Red-Or. Osc. Grid
60	2500Ω	5		AB-2500	Voltage Dropping
61	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AVC Network
62	27KΩ	2		BT-2-27K	Red-Vi.-Or. Screen Bleeder
63	1200Ω	½		BTS-1200	Br.-Red-Red 1st IF Cathode
64	330Ω	½		BW-½-330	Or.-Or.-Br. 2nd IF Cathode
65	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AVC Network
66	1.5 Meg.	½		BTS-1.5 Meg.	Br.-Grn.-Grn. " "
67	1.5 Meg.	½		BTS-1.5 Meg.	Br.-Grn.-Grn. " "
68	4.3Ω	1		BW-1-4.3	Yl.-Or.-Gold Fil. Dropping
69	220KΩ	½		BTS-220K	Red-Red-Yl. BFO Voltage Dropping
70	100KΩ	½		BTS-100K	Br.-Blk.-Yl. BFO Screen Dropping
71	100KΩ	½		BTS-100K	Br.-Blk.-Yl. BFO Voltage Bleeder
72	15KΩ	2		BT-2-15K	Br.-Grn.-Or. Screen Dropping
73	1800Ω	½		BTS-1800	Br.-Gray-Red "S" Meter Network
74	270Ω	½		BW-½-270	Red-Vi.-Br. "S" Meter Shunt
75	2200Ω	½		BTS-2200	Red-Red-Red 2nd IF Plate Decoupling
76	22KΩ	½		BTS-22K	Red-Red-Or. Diode Load
77	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Diode Load
78	220KΩ	½		BTS-220K	Red-Red-Yl. Limiter Plate
79	220KΩ	½		BTS-220K	Red-Red-Yl. Limiter Threshold Filter
80	4.3Ω	1		BW-1-4.3	Yl.-Or.-Gold Limiter Filament Dropping
81	220KΩ	½		BTS-220K	Red-Red-Yl. Limiter Cathode
82	220KΩ	½		BTS-220K	Red-Red-Yl. AF Voltage Divider
83	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Lim. Plate Load
84	820KΩ	½		BTS-820K	Gray-Red-Yl. Lim. Plate Decoupling.
85	2200Ω	½		BTS-2200	Red-Red-Red AF Cathode
86	820KΩ	½		BTS-820K	Gray-Red-Yl. AF Screen
87	100KΩ	½		BTS-100K	Br.-Blk.-Yl. AF Plate Load
88	47KΩ	½		BTS-47K	Yl.-Vi.-Or. AF Decoupling
89	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
90	330Ω	3		BW-3-330	Or.-Or.-Br. Output Cathode

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	NATIONAL PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
91	230V AC tapped @ 117V AC @ .65A	590V CT .095A DC	5.1V AC @ 2.0A	6.2V AC @ 3.3A				

FILTER CHOKE

ITEM NO.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000~)	NATIONAL PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	
92	.095A.	290Ω	17 Henries					



DATE 11/48-#4430-12 SET #50-FOLDER #12

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Controls should be set as follows except where noted otherwise: Limiter control to "Off" AF Gain at "10", tone switch at "High", CWO control at "OFF", RF Gain control at "9", B+ switch at "ON", Selectivity switch at "Off", Phasing control at "Zero" and AVC switch at "OFF".

Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment tool for all adjustments.

IF ALIGNMENT "CHECK" TO BE MADE PRIOR TO ALIGNMENT.

(a) Set Selectivity Switch to 5, AVC to "Off", RF Gain at "9", Phasing Control at zero and CWO Control to "On". Vary CWO Control to point of lowest background noise and note setting, which should occur near 9.
(b) Set Selectivity Switch to "Off" and vary CWO control to point of lowest background noise and note setting which should occur near 9.
(c) If IF Alignment is correct the two settings from (a) to (b) should coincide and Steps 1, 2 and 3 may be omitted.

IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	COIL SET	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	Direct	High side to grid cap. of 6J7 Mixer Tube (3). Low side to chassis.	Approx. 456KC (Unmodulated)	Band "E"	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4 A5	Set selectivity switch at "5". Turn CWO "ON". Adjust sig. gen. frequency for maximum output. Adjust "CWO" control to give approximately 400 ~ note. Adjust A1 thru A5 for maximum output.
2	Direct	"	Tune 3 or 4KC to either side of freq. determined in Step 1.	"	"	"	A6	Set selectivity switch to 1. Adjust A6 for maximum output. Return selectivity switch to "OFF".
3	Direct	"	Exact freq. determined in Step 1	"	"	"	A7,A8	Adjust A7 for maximum output. Check CWO tuning per part (B) of IF Alignment check in prealignment instructions. If setting of CWO control does not occur near "9" set CWO control at "9" and adjust A8 for lowest background noise. If setting is at or near "9" then A8 is adjusted correctly.

GENERAL COVERAGE ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	COIL SET	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
4	400Ω carbon res.	High side to ant. terminal "A". Low side to center ant. terminal with link connected.	30.0MC	Band "A"	485	Across voice coil	A9	Adjust for maximum output. Tune sig. gen. to 30.9MC. If signal is not heard, retune sig. gen. to 30.0 MC and open A9 to next peak. Adjust for maximum output.and recheck for image.
5	"	"	"	"	Tune for maximum output.	"	A10, A11,A12	Rock tuning cap. and adjust for maximum output.
6	"	"	14.4MC	"	54	"	A13,A14, A15,A16	Adjust for maximum output. Repeat Steps 4, 5 & 6 until no further improvement can be made, making Step 5 last step.
7	"	"	"	Band "B"	485	"	A17	Adjust for maximum output. Tune sig. gen. to 15.3MC. If signal is not heard, retune sig. gen. to 14.4 MC and open A17 to next peak. Adjust for maximum output and recheck for image.
8	"	"	"	"	Tune for maximum output.	"	A18, A19,A20	Rock tuning cap. and adjust for maximum output.
9	"	"	7.0MC	"	28	"	A21,A22 A23,A24	Adjust for maximum output. Repeat Steps 7, 8 & 9 until no further improvement can be made, making Step 8 last step.
10	"	"	7.3MC	Band "C"	490	"	A25	Adjust for maximum output. Tune sig. gen. to 8.2MC. If signal is not heard, retune sig. gen. to 7.3 MC and open A25 to next peak. Adjust for maximum output and recheck for image.
11	"	"	"	"	Tune for maximum output.	"	A26,A27 A28	Rock tuning cap. and adjust for maximum output.
12	"	"	3.5MC	"	23	"	A29,A30 A31,A32	Adjust for maximum output. Repeat Steps 10, 11 & 12 until no further improvement can be made, making Step 11 last step.
13	"	"	4.0MC	Band "D"	490	"	A33	Adjust for maximum output. Tune sig. gen. to 4.9MC. If signal is not heard, retune sig. gen. to 4.0MC and open A33 to next peak. Adjust for maximum output and recheck for image.
14	"	"	"	"	Tune for maximum output.	"	A34, A35,A36	Rock tuning cap, and adjust for maximum output.
15	"	"	1.8MC	"	36	"	A37,A38, A39,A40	Adjust for maximum output. Repeat Steps 13, 14 & 15 until no further improvement can be made, making Step 14 last step.

BANDSPREAD ALIGNMENT

General coverage alignment should be completed before bandspread alignment. Tracking of RF stages at low frequency end of each band may be checked as follows: After adjustments of padders is completed attempt to peak each stage with its associated high freq. trimmer. Any change in capacitance should cause a decrease in output if that stage is tracking correctly. This checking procedure will misalign the high frequency trimmers, therefore they should be repeaked at the high frequency end of the band per alignment instructions.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	COIL SET	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
16	400Ω carbon res.	High side to ant. terminal "A". Low side to center ant. terminal with link connected.	30.0MC	Band"A"	450	Across voice coil	A41	Adjust for maximum output. Tune sig. gen. to 30.9MC. If signal is not heard retune sig. gen. to 30.0 MC and open A41 to next peak. Adjust for maximum output and recheck for image.
17	"	"	"	"	Tune for maximum output.	"	A42, A43, A44	Rock tuning cap. and adjust for maximum output.
18	"	"	27.2MC	"	61	"	A45, A46, A47, A48	Adjust for maximum output. Repeat Steps 16, 17 & 18 until no further improvement can be made, making Step 17 last step.
19	"	"	14.4MC	Band"B"	450	"	A49	Adjust for maximum output. Tune sig. gen. to 15.3MC. If signal is not heard, retune sig. gen. to 14.4 MC and open A49 to next peak. Adjust for maximum output and recheck for image.
20	"	"	"	"	Tune for maximum output.	"	A50, A51, A52	Rock tuning cap. and adjust for maximum output.
21	"	"	14.0MC	"	50	"	A53, A54, A55, A56	Adjust for maximum output. Repeat Steps 19, 20 & 21 until no further improvement can be made, making Step 20 last step.
22	"	"	7.3MC	Band"C"	450	"	A57	Adjust for maximum output. Tune sig. gen. to 8.2MC. If signal is not heard, retune sig. gen. to 7.3MC and open A57 to next peak. Adjust for maximum output and recheck for image.
23	"	"	"	"	Tune for maximum output.	"	A58, A59, A60	Rock tuning cap. and adjust for maximum output.
24	"	"	7.0MC	"	50	"	A61, A62, A63, A64	Adjust for maximum output. Repeat Steps 22, 23 and 24 until no further improvement can be made, making Step 23 last step.
25	"	"	4.0MC	Band"D"	450	"	A65	Adjust for maximum output. Tune sig. gen. to 4.9MC. If signal is not heard. retune sig. gen. to 4.0 MC and open A65 to next peak. Adjust for maximum output and recheck for image.
26	"	"	"	"	Tune for maximum output	"	A66, A67, A68	Rock tuning cap. and adjust for maximum output.
27	"	"	3.5MC	"	50	"	A69, A70, A71, A72	Adjust for maximum output. Repeat Steps 25, 26 & 27 until no further improvement can be made, making Step 26 last step.

1ST RF STAGE ALIGNMENT WITH LOW IMPEDANCE TRANSMISSION LINE.

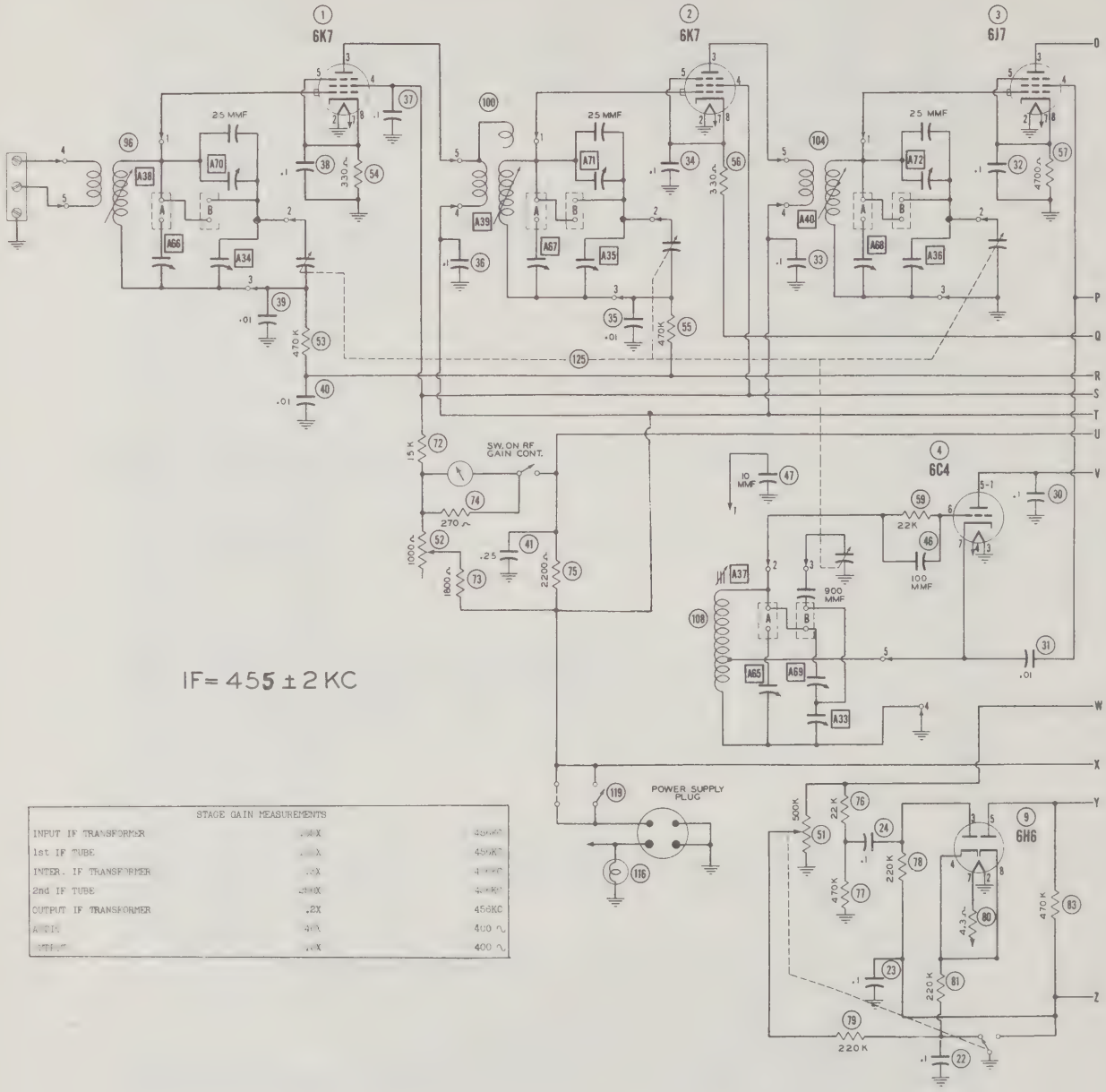
If a low impedance trasmission line is to be used with the receiver it may be necessary to realign the first RF amplifier at the high frequency end of each band.

GENERAL COVERAGE

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	COIL SET	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
28		Antenna feeders must be connected. (Use radiated signal from sig. gen. with no direct connection)	30.0MC	Band"A"	Tune for maximum output.	Across voice coil	A10	Adjust for maximum output.
29		"	14.4MC	Band"B"	"	"	A18	" " " "
30		"	7.3MC	Band"C"	"	"	A26	" " " "
31		"	4.0MC	Band"D"	"	"	A34	" " " "

BANDSPREAD ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	COIL SET	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
32		Antenna feeders must be connected. (Use radiated signal from sig. gen. with no direct connection).	30.0MC	Band"A"	Tune for maximum output.	Across voice coil	A42	Adjust for maximum output.
33		"	14.4MC	Band"B"	"	"	A50	" " " "
34		"	7.3MC	Band"C"	"	"	A58	" " " "
35		"	4.0MC	Band"D"	"	"	A66	" " " "



STAGE GAIN MEASUREMENTS		
INPUT IF TRANSFORMER	.8X	456KC
1st IF TUBE	[illegible]X	456KC
INTER. IF TRANSFORMER	.8X	[illegible]
2nd IF TUBE	[illegible]X	[illegible]
OUTPUT IF TRANSFORMER	.2X	456KC
[illegible]	[illegible]	400 ∿
[illegible]	.8X	400 ∿

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

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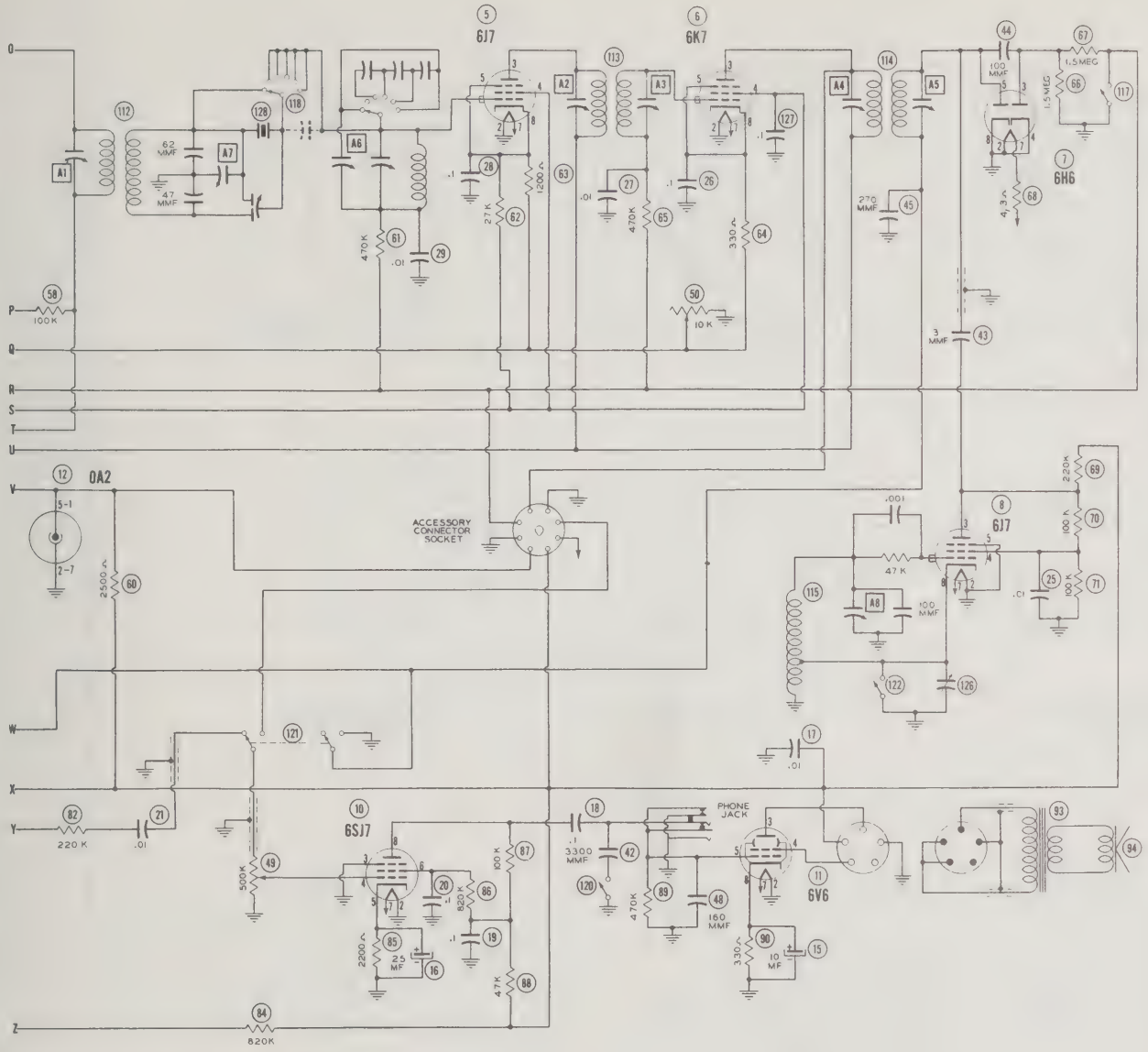

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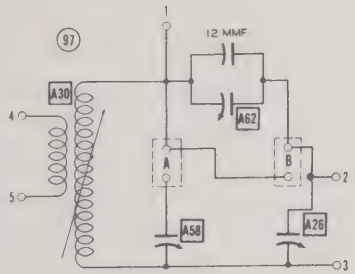
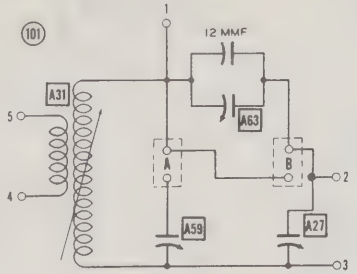
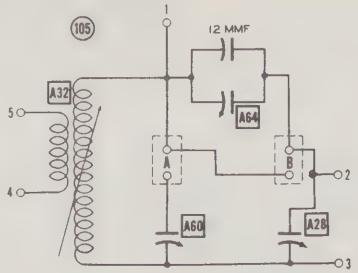
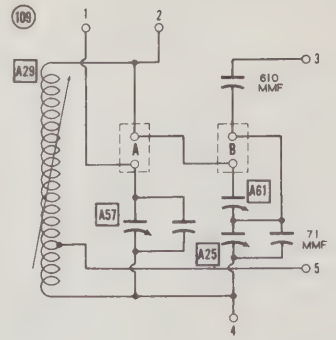
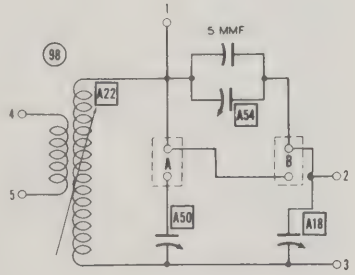


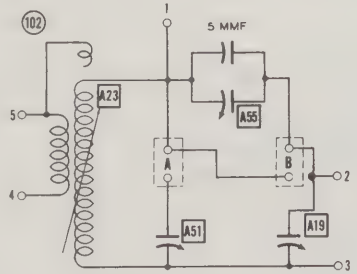


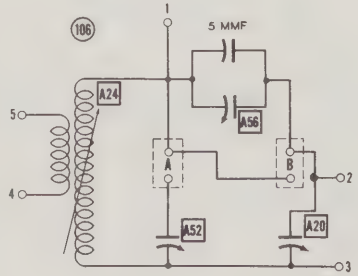


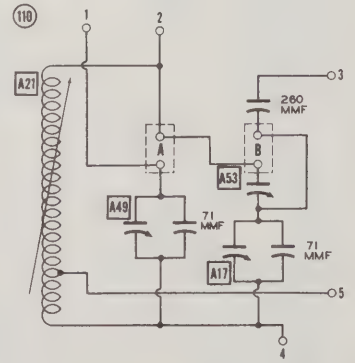


BAND C

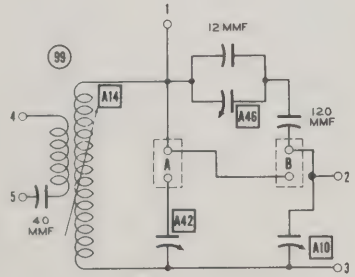


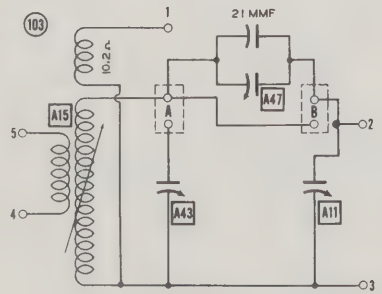


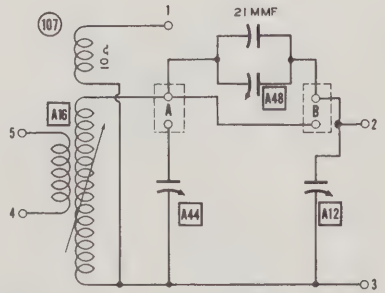


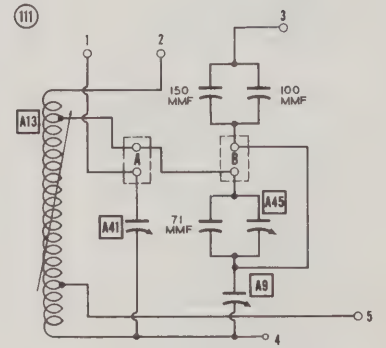


BAND B









BAND A

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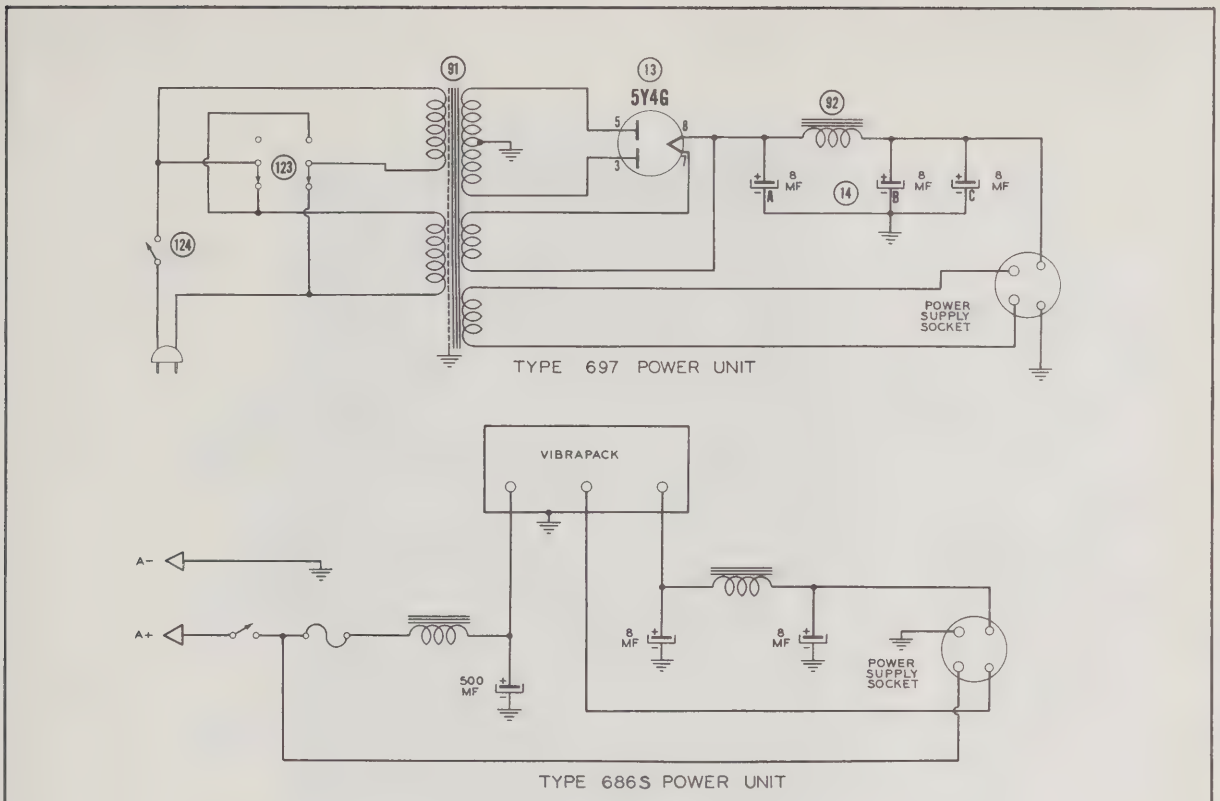

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4820-12

MAIN TUNING DIAL

The main tuning dial should normally give no trouble. If, however, the dial should become removed from the Receiver it should NOT be operated until mounted on the condenser shaft WITH SET-SCREWS TIGHT. This is because the dial is only designed to rotate for ten revolutions (0 to 500) and if turned farther than this the mechanism will be damaged. When mounted on the condenser, limit stops protect the dial provided the assembly is properly done. The procedure for re-mounting the dial is as follows:

(a) Place dial on condenser shaft, tighten set-screws and turn dial counter-clockwise to fully mesh condenser rotor plates so that the tips of the rotor plates are flush with the edge of the stator plates.

(b) Loosen set-screws and rotate dial slowly until dial reading has decreased to zero.

(c) Tighten the set-screws.

(d) Check position of rotor plates at zero. The tips of the rotor plates should be flush with the edge of the stator plates at zero. A slight adjustment may be necessary and this is done by loosening the set-screws, adjusting the position of the dial and tightening the set-screws again.

If it is necessary to remove the dial at any future time, turn to 250 before removing the dial, and do not disturb the setting of either the dial or condenser until reassembled. If in doubt about the correct position, inspect the springs on the back of the dial. When the dial reads 250 these springs should be straight-up-and-down, they must not be tipped to one side.

It is important that the backplate and dial do not become separated.

The backplate is held in place by two springs so that its gear teeth mesh with the dial gear teeth in correct relationship for proper dial operation. If this backplate should be sprung out of place, it may return to an incorrect position and the proper dial numbers will not appear in the windows when the dial is used. To ascertain that the two parts are in correct position, proceed as follows:

(a) Locate small window near outer periphery of dial backplate and also locate dial number window on face of dial which is 180° removed from the small backplate window.

(b) Hold dial so backplate lies flat in palm of left-hand and with right hand rotate dial knob until 250 appears in previously located dial window.

(c) If dial is properly adjusted it will be noted that the pointer at the outer edge of the small window lines up with a marked tooth on the dial itself. It will be found that the dial and backplate can be moved so that the backplate pointer will mesh between teeth at points equi-distant from marked tooth in either direction.

(d) If by checking as in paragraph,(c), the dial is found not properly adjusted, it will be necessary to separate the backplate from the dial far enough to bring the two gears out of mesh and then re-mesh the two parts until the proper setting is found. A number of trials may be required before the correct mesh is found.

BANDSPREAD SWITCHING PROCEDURE

The bandspread switch for bands A, B, C and D are located on each coil set. Inspection of the coil set terminal panels will show several small rectangular metal pieces. There are two of these metal pieces or terminal blocks on each coil which are tapped and countersunk for a flat-head machine screw. It will be noted that these terminal blocks correspond to contacts numbered 1 and 2 on the antenna and RF coils and to contacts numbered 2 and 3 on the oscillator coils. Looking at the coil forms from the front and top the bandswitch screws must be in the left-hand position (in line with contact #2 of the antenna and RF coils and contact #3 of the oscillator coil) for general coverage tuning. On the schematic diagram and the circuit diagrams of the individual coils this position is designated with the letter "B". The coil range will be shown on the top scale of the calibration chart on the front of each coil set. To change to bandspread it is necessary to move the screw to the right-hand position (in line with contact #1 on the antenna and RF coils and contact #2 on the oscillator coil). On the schematic diagram and the circuit diagrams of the individual coils this position is designated with the letter "A". The coil range will be shown on the bottom scale of the calibration chart on the front of each coil set. The numbers shown on the schematic diagram and the circuit diagrams of the individual coils correspond to the contacts as they are numbered on each coil set.

VOLTAGE AND RESISTANCE TAKEN WITH AC LINE SET AT 115V AC.
VOLTAGE AND RESISTANCE TAKEN ON BAND "D".
SELECTIVITY CONTROL IN OFF POSITION.
TONE CONTROL SET AT HIGH POSITION.
RF GAIN SET AT MAXIMUM. AF GAIN SET AT MINIMUM.
PHASING CONTROL AT 0. AVC ON. B+ SWITCH ON.
RADIO-PHONO SWITCH IN RADIO POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6K7	0V.	0V.	220VDC	85VDC	2.6VDC	0V.	6.2VAC	2.6VDC
2	6K7	0V.	0V.	220VDC	85VDC	2.6VDC	0V.	6.2VAC	2.6VDC
3	6J7	0V.	0V.	220VDC	180VDC	8VDC	0V.	6.2VAC	8VDC
4	6C4	150VDC	0V.	0V.	6.2VAC	150VDC	-35VDC§	0V.	-
5	6J7	0V.	0V.	205VDC	85VDC	4VDC	0V.	6.2VAC	4VDC
6	6K7	0V.	0V.	205VDC	85VDC	2.6VDC	0V.	6.2VAC	2.6VDC
7	6H6	0V.	0V.	0V.	0V.	-.1VDC	-.1VDC	5VAC	0V.
# 8	6J7	0V.	0V.	50VDC	20VDC	0V.	0V.	6.2VAC	0V.
* 9	6H6	0V.	0V.	0V.	0V.	0V.	0V.	5VAC	0V.
10	6SJ7	0V.	0V.	0V.	0V.	1.6VDC	45VDC	6.2VAC	115VDC
11	6V6GT	0V.	0V.	210VDC	220VDC	0V.	0V.	6.2VAC	12.5VDC
12	0A2	150VDC	0V.	0V.	0V.	150VDC	0V.	0V.	-
13	5Y3GT	0V.	250VDC	0V.	295VAC	0V.	295VAC	0V.	250VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

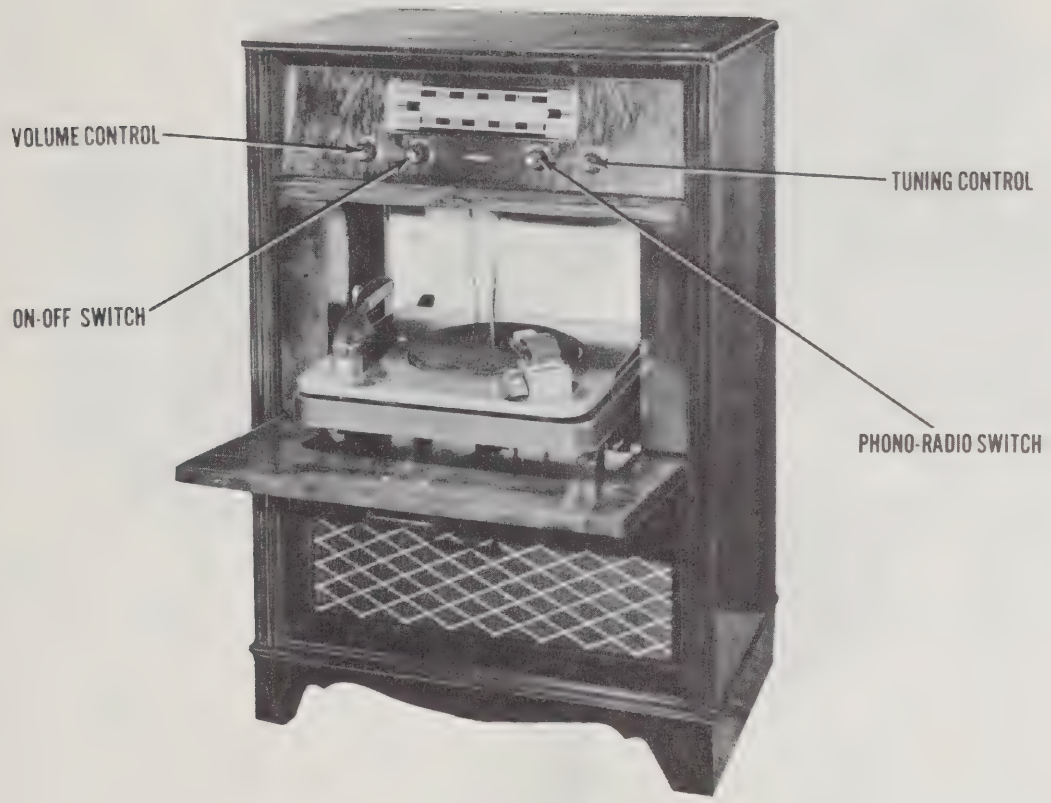
RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6K7	0Ω	0Ω	40KΩ	30KΩ	330Ω	INF.	.1Ω	330Ω
2	6K7	0Ω	0Ω	40KΩ	30KΩ	330Ω	INF.	.1Ω	330Ω
3	6J7	0Ω	0Ω	40KΩ	140KΩ	4.7KΩ	INF.	.1Ω	4.7KΩ
4	6C4	40KΩ	INF.	0Ω	.1Ω	40KΩ	22KΩ	.4Ω	-
5	6J7	0Ω	0Ω	40KΩ	30KΩ	1.2KΩ	INF.	.1Ω	1.2KΩ
6	6K7	0Ω	0Ω	40KΩ	30KΩ	330Ω	INF.	.1Ω	330Ω
7	6H6	0Ω	0Ω	1.5 Meg.	0Ω	120KΩ	120KΩ	4.4Ω	0Ω
# 8	6J7	0Ω	0Ω	130KΩ	100KΩ	0Ω	INF.	.1Ω	0Ω
* 9	6H6	0Ω	0Ω	220KΩ	70CKΩ	46CKΩ	1.5 Meg.	4.4Ω	220KΩ
10	6SJ7	0Ω	0Ω	0Ω	500KΩ	2.2KΩ	1 Meg.	.1Ω	170KΩ
11	6V6GT	0Ω	0Ω	40KΩ	40KΩ	470KΩ	INF.	.1Ω	330Ω
12	0A2	40KΩ	0Ω	INF.	0Ω	40KΩ	0Ω	0Ω	-
13	5Y3GT	INF.	40KΩ	INF.	340Ω	INF.	355Ω	INF.	40KΩ

*LIMITER CONTROL ON.
#CWO ON.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



PHILCO
MODEL 49-1600

PHILCO
MODEL 49-1600

PHILCO MODEL 49-1600

TRADE NAME	Philco, Model 49-1600
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	AC Operated Combination Phono-Radio, Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 14Q7 Converter, 12BA6 IF Amp., 7C6 Det.-AVC-AF, 35L6GT Power Output, 50X6 Rectifier.
POWER SUPPLY	110-120 Volts AC
TUNING RANGE—BROADCAST	540-1620KC RATING .37 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set dial pointer turn tuning cap. fully closed and set pointer 2-3/4" from left edge of dial backplate. This is the calibration mark referred to in steps below.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to ext. ant. lead. (with loop connected). Low side to B-.	455KC	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1600KC	5-7/8" from calibration mark.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust A5 for maximum output.
3		"	1500KC	Tune for maximum output.	"	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		PHILCO PART No.	STANDARD REPLACEMENT		
1	Converter	14Q7	14Q7	8AL	
2	IF Amp.	12BA6	12BA6	7BK	
3	Det.-AVC-AF	7C6	7C6	8W	
4	Power Output	35L6GT	35L6GT	7AC	
5	Rectifier	50X6	50X6		

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
6A	75	250	30-2575-23				D13309	Filter-Orange
B	40	250						" -Red
C	10	250						Decoupling-Blue
7	20	150	30-2568-22		UP3015	DY-20-150	EL-31	Voltage Doubler
8	.05	400	61-0122	484-05	DT4S5	ST-4-05	TC-15	Line Filter
9	.1	400	61-0113	484-.1	DT4P1	ST-4-1	72P2	Line Isolation
10	.006	400		484-006	DT6D6	ST-6-006	TC-26	Output Plate Bypass
11	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
12	.02	400		484-02	DT4S2	ST-4-02	TC-12	" "
13	.1	400	61-0113	484-.1	DT4P1	ST-4-1	TC-1	AF Plate Decoupling
14	.003	600	61-0109	684-003	DT6D3	ST-6-003	TC-23	IF Decoupling
15	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	IF Screen Bypass
16	.05	200	45-3500-2	484-05	DT4S5	ST-2-05	TC-15	AVC Filter
17	.03	400	45-3500-1	484-03	DT4S3	ST-4-03	TC-13	" "
18	220	300	62-122001001	1468-0002	5W5T2	MO.5-32	1FM-32	Output Grid Bypass-Cer.
19	10	300	30-1224-26	1468-00001	5W5Q1	MO.5-41	1FM-41	Fixed Trimmer-Cer.
20	56	500	62-056409001	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.
21	5	300	60-90505007	1468-000005	5W5V5	MO.5-55	MS-55	Ext. Ant. Coupling-Cer.

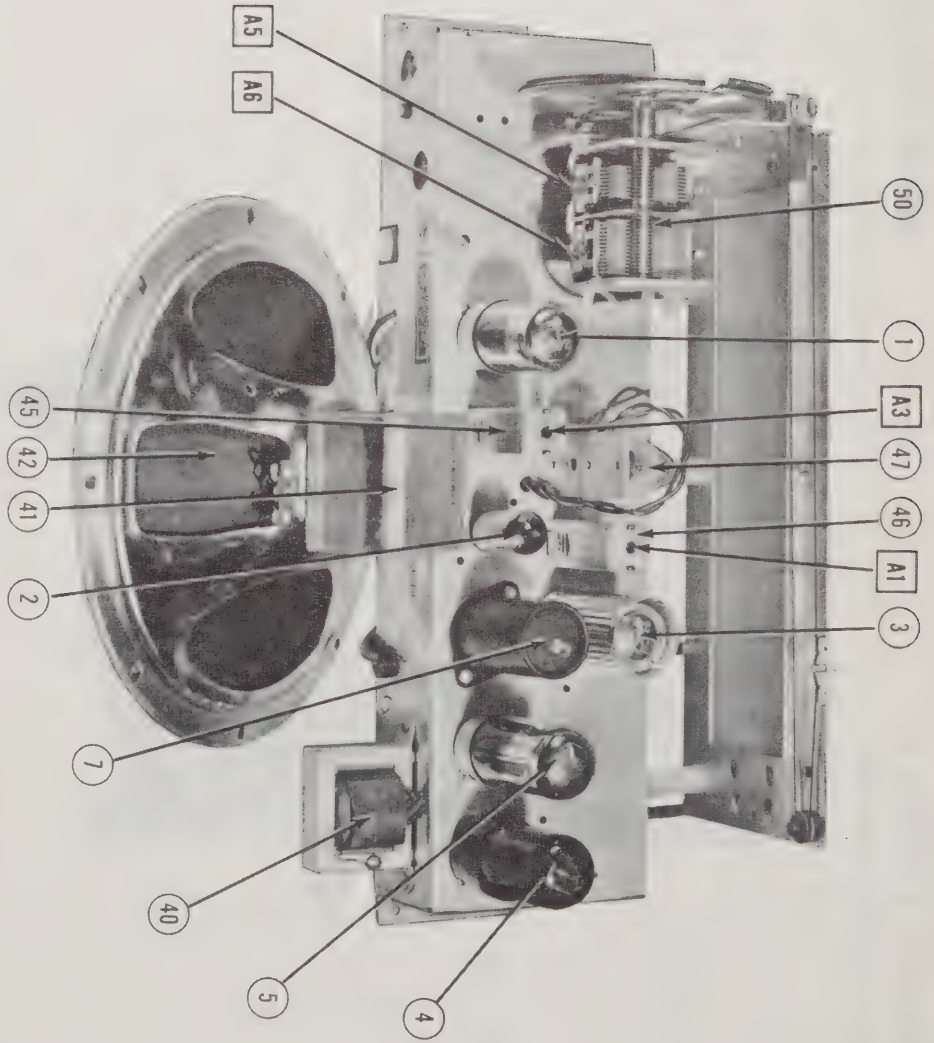
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	
22A	500KΩ	½	33-5539-45	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 22A as per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	
23	150KΩ	½	66-4153340	BTS-150K	Br.-Blk.-Yl. Ant. Loading
24	22KΩ	½	66-3223340	BTS-22K	Red-Red-Or. Osc. Grid
25	10Ω	½	66-0103340	BW-½-10	Br.-Blk.-Blk. Parasitic Suppressor
26	22KΩ	½	66-3223340	BTS-22K	Red-Red-Or.-AVC Network
27	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. " "
28	100KΩ	½	66-5103340	BTS-100K	Br.-Blk.-Yl. IF Screen
29	1000Ω	½	66-3103340	BTS-1000	Br.-Blk.-Red IF Decoup.
30	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Diode Filter
31	10 Meg.	½	66-5103340	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
32	270KΩ	½	66-4273340	BTS-270K	Red-Vi.-Yl. AF Plate Load
33	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. Output Grid
34	180Ω	½	66-1183340	BTS-½-180	Br.-Gray-Br. Output Cathode
35	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. AF Plate Decoupling
36A	4700Ω	10	33-3435-18	AB-5000	Filter
B	180Ω	10		AB-200	"
37	25Ω	3	33-1334-5	AB-25	Red-Grn.-Blk. Current Limiting Res.
38	120KΩ	½	66-4123340	BTS-120K	Br.-Red-Yl. Line Isolation
39	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
40	4300Ω	3.5Ω	450Ω	.7Ω	32-3242-3	A-3877†	T22S46†	A-2902†	†Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			PHILCO PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-115		
41	PM	3.5Ω	36-1626-1	Mod. P8-V	8A21	
	CONE DIA.	VC DIA.				
42	7-3/8"	9/16"				

R F COILS

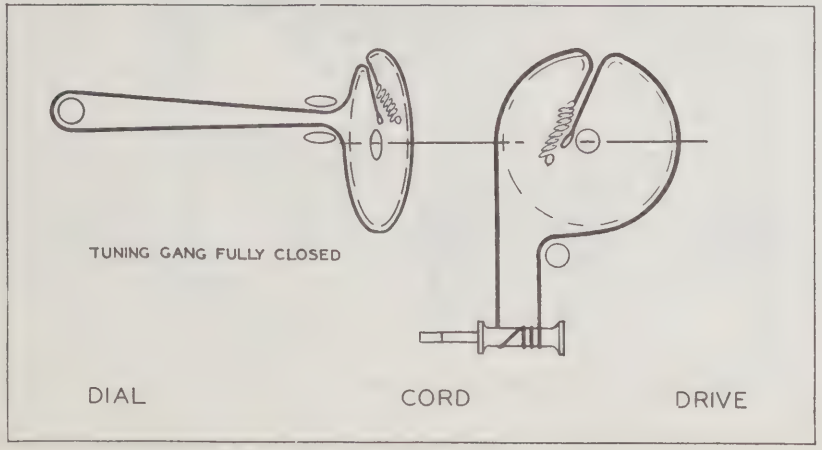
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	PHILCO PART No.	MEISSNER PART No.	
43	Loop Ant.		4Ω	76-2127-8		
44	Osc. Coil	1.1Ω	9.4Ω	32-4190-2	14-1060	
45	Input IF	13Ω	13Ω	32-4160	16-6678	
46	Output IF	17Ω	17Ω	32-4240		

DIAL LIGHT

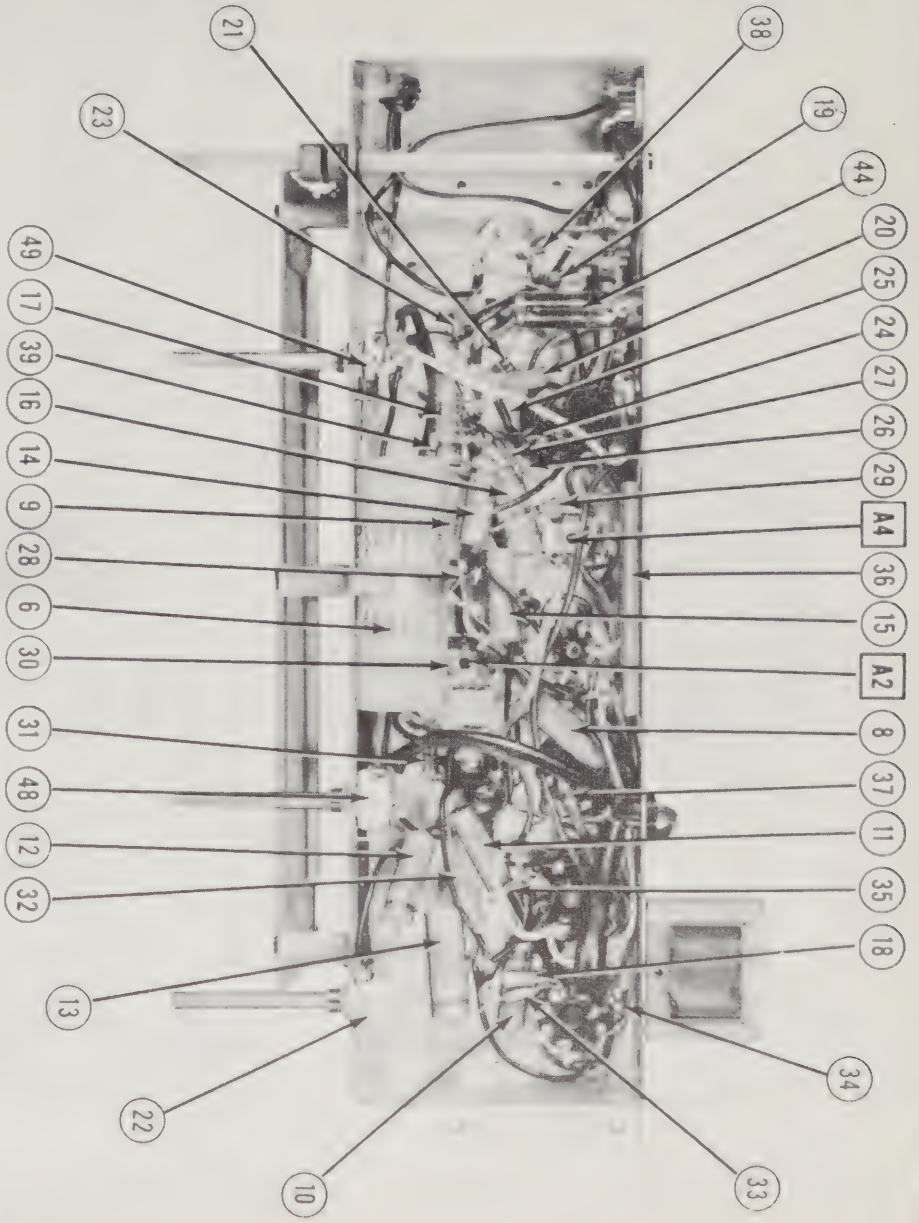
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					PHILCO PART No.		
47	Screw	110			34-2605		Type C7

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
48	Switch	42-1837-3	On-Off
49	"	42-1824-2	Radio-Phono
50	2 Gang Var. Cap.	31-2727-3	(17-484MMF, 16-164MMF)
	Cabinet	10713	
	Dial Scale	54-5007	
	Dial Pointer	56-5630-3FCP	
	Knob	64-4427	(4 Used)

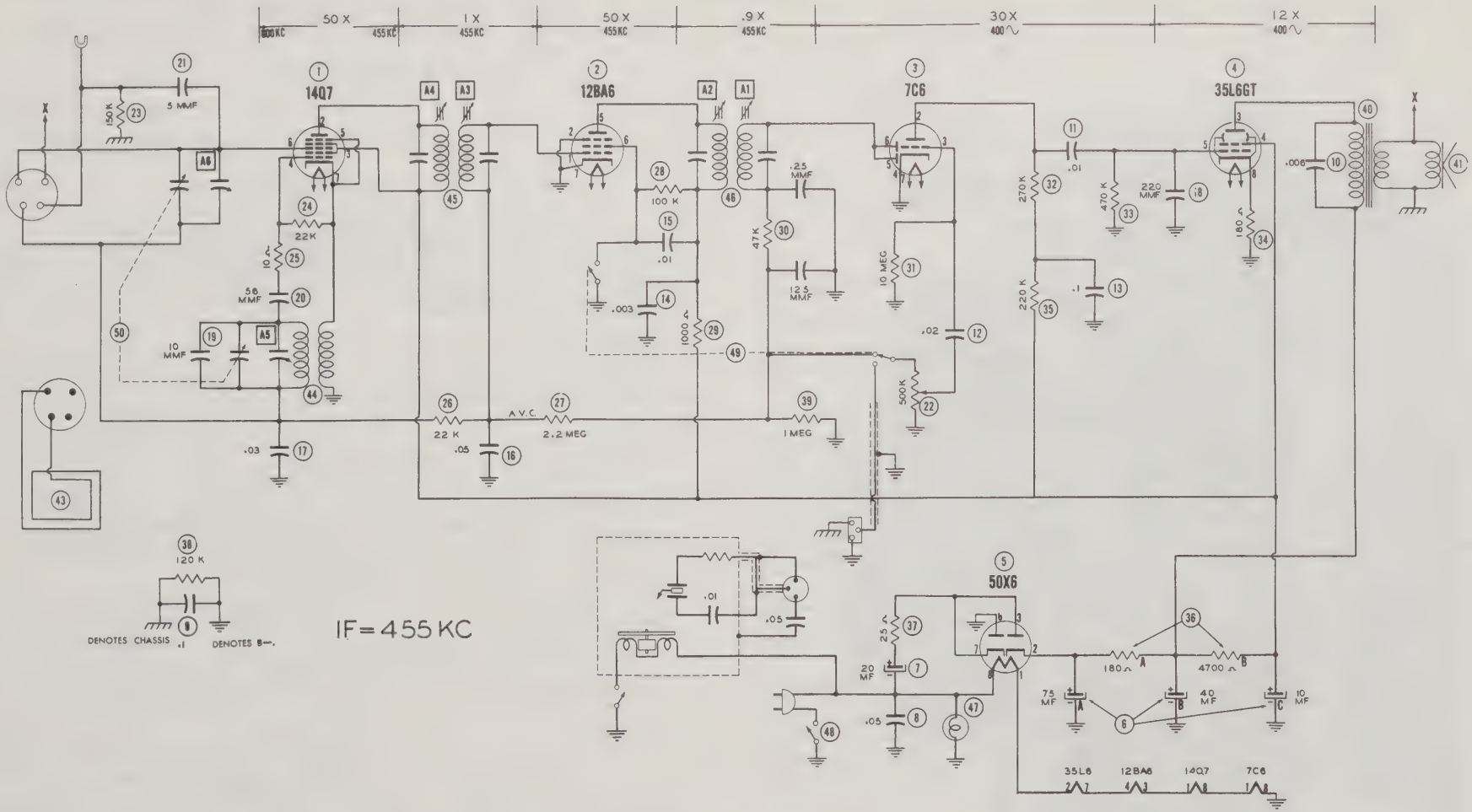


CHASSIS—BOTTOM VIEW



DATE 11/48-#4820-13 SET #50-FOLDER #13

PHILCO MODEL 49-1600



RADIO-PHONO SWITCH IN RADIO POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14Q7	19VAC	115VDC	115VDC	-4.6VDC§	0V.	-.1VDC	0V.	6.4VAC
2	12BA6	-.4VDC	0V.	19VAC	31VAC	110VDC	35VDC	0V.	-
3	7C6	6.4VAC	90VDC	-.4VDC	0V.	-.4VDC	-.4VDC	0V.	0V.
4	35L6GT	0V.	65VAC	190VDC	115VDC	0V.	0V.	31VAC	8.2VDC
5	50X6	65VAC	220VDC	110VDC	210VDC	0V.	0V.	110VDC	117VAC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14Q7	20Ω	80KΩ	80KΩ	22KΩ	1.1Ω	2.5 Meg.	1.1Ω	8Ω
2	12BA6	2.5 Meg.	0Ω	20Ω	30Ω	80KΩ	180KΩ	0Ω	-
3	7C6	8Ω	570KΩ	10 Meg.	0Ω	380KΩ	380KΩ	0Ω	0Ω
4	35L6GT	120KΩ	58Ω	80KΩ	80KΩ	470KΩ	0Ω	30Ω	180Ω
5	50X6	58Ω	80KΩ	130KΩ	80KΩ	0Ω	0Ω	130KΩ	85Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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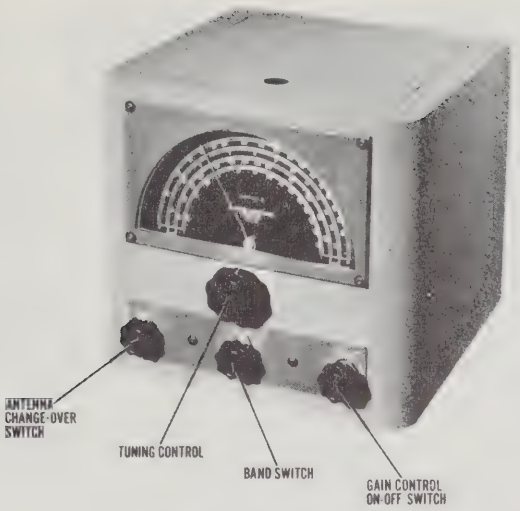
4820-13

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RME
MODEL DB-22A



RME MODEL DB-22A

TRADE NAME	RME, Model DB-22A
MANUFACTURER	Radio Manufacturing Engineers, Inc., 300-306 1st Avenue, Peoria, Illinois
TYPE SET	AC Operated RF Amplifier and Pre-Selector
TUBES (THREE)	Types, 6BA6 RF Amp., 6BA6 RF Amp., 6X4 Rectifier.
POWER SUPPLY	110-120 Volts AC RATING .1 Amp. @ 117 Volts AC
SHORT WAVE	Band #2 - 1.65-5.0MC, Band #3 - 5.0-15.0MC, Band #4 - 15.0-44.0MC
TUNING RANGE—BROADCAST	540-1650KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low frequency end of dial.

Gain control should be at maximum position, change over switch at "in" position and output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	200MMFD	High side to right hand ant. terminal. Low side to chassis.	1200KC	Band 1 (fully counter clock-wise)	1200KC	Across voice coil of associat-ed rec.	A1, A2, A3	Adjust for maximum output.
2	200MMFD	High side to right hand ant. terminal. Low side to chassis.	600KC	Band 1 (fully counter clock-wise)	600KC	Across voice coil of associat-ed rec.	A4, A5, A6	Adjust for maximum out-put. Repeat steps 1 & 2 until no further improve-ment can be made.
3	300Ω carbon resist-or	High side to right hand ant. terminal. Low side to chassis.	3.5MC	Band 1 (1 pos-ition from fully counter clock-wise)	3.5MC	Across voice coil of associat-ed rec.	A7, A8. A9	Adjust for maximum output.
4	300Ω carbon resist-or	High side to right hand ant. terminal. Low side to chassis.	1.8MC	Band 1 (1 pos-ition from fully counter clock-wise)	1.8MC	Across voice coil of associat-ed rec.	A10, A11, A12	Adjust for maximum out-put. Repeat steps 3&4 until no further improve-ment can be made.
5	300Ω carbon resist-or	High side to right hand ant. terminal. Low side to chassis.	11MC	Band 2 (2 pos-itions from fully counter clock-wise.	11MC	Across voice coil of associat-ed rec.	A13, A14, A15	Adjust for maximum out-put.
6	300Ω carbon resist-or	High side to right hand ant. terminal. Low side to chassis.	32MC	Band 4 (fully clock-wise)	32MC	Across voice coil of associat-ed rec.	A16, A17, A18	Adjust for maximum out-put.

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PARTS LIST AND DESCRIPTIONS

RME MODEL DB-22A

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RME PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6BA6	6BA6	7BK	
2	RF Amp.	6BA6	6BA6	7BK	
3	Rectifier	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RME PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
4A	20	150		PRSA150/20-20	EDL2215	DSB-2X20-150	TA220	Filter
B	20	150		"	"	"	"	"
5	.1	200		464-.1	DT2P1	ST-2-1	TC-1	2nd RF Screen Bypass
6	.01	200		484-01	DT2S1	ST-4-01	TC-11	2nd RF Cathode Bypass
7	.01	200		484-01	DT2S1	ST-4-D-01	TC-11	1st RF Screen Bypass
8	.01	200		484-01	DT2S1	ST-4-01	TC-11	1st RF Cathode Bypass
9	5	300		1468-000005	5W5V5	MO.5-55	MS-55	RF Coupling - Ceramic

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RME PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
10 (A)	30KΩ	½				Gain Control
(B)	Shaft					
(C)	Switch					

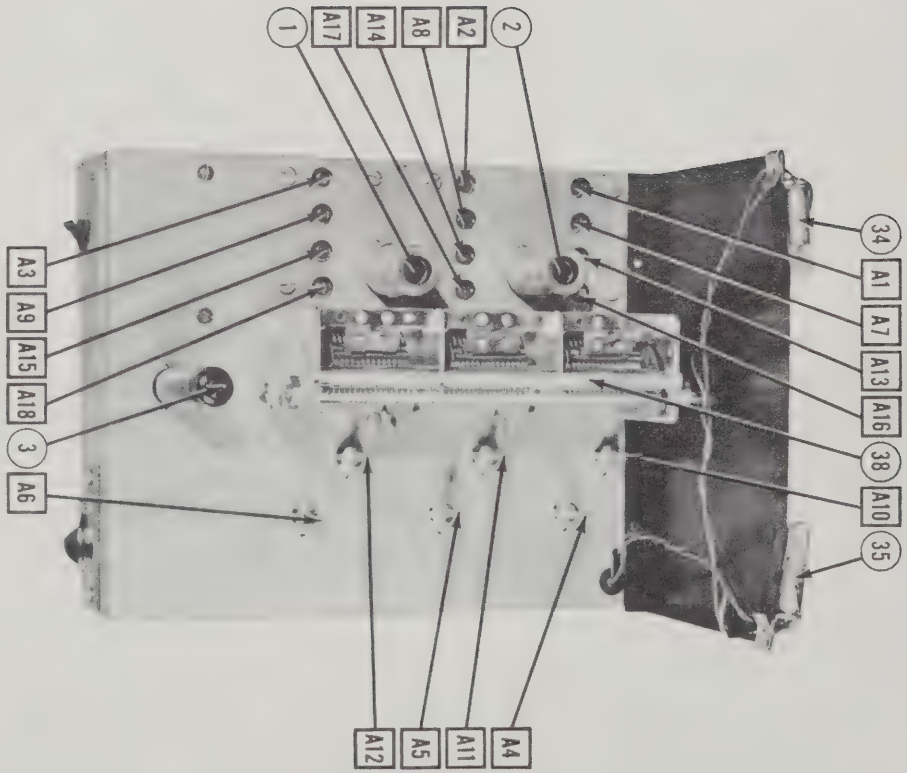
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RME PART No.	IRC PART No.	IDENTIFICATION CODES
11	100Ω	½			Br.-Blk.-Br. 1st RF Cathode
12	2000Ω	½		BTS-2200	Red- Blk.-Red 1st RF Plate Decoupling
13	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Bias
14	10KΩ	½		BTS-10K	Br.-Blk.-Or. Band 3 RF Coil Secondary Shunt
15	4700Ω	½		BTS-4700	Yl.-Vi.-Red Band 2 RF Coil Secondary Shunt
16	4700Ω	½		BTS-4700	Yl.-Vi.-Red Band 1 RF Coil Secondary Shunt
17	2200Ω	½		BTS-2200	Red-Red-Red 2nd RF Plate Decoupling
18	100Ω	½			Br.-Blk.-Br. 2nd RF Cathode
19	47KΩ	½		BTS-47K	Yl.-Vi.-Or. 2nd RF Grid
20	1900Ω	5		AB-2000	Filter

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: RME PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
21	117VAC @ .1A	220VCT .016ADC	6.3VAC @ 1.4A					

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA RME PART No.	REPLACEMENT DATA MEISSNER PART No.
22	Band				
22	Ant. Coil 1	1.4Ω	3.5Ω		
23	" " 2	.5Ω	.9Ω		
24	" " 3	0Ω	0Ω		
25	" " 4	0Ω	0Ω		
26	RF Coil 1	1.5Ω	3.5Ω		
27	" " 2	.5Ω	.9Ω		
28	" " 3	0Ω	0Ω		
29	" " 4	0Ω	0Ω		
30	Output RF 1	1.5Ω	3.6Ω		
31	" " 2	.5Ω	.8Ω		
32	" " 3	0Ω	0Ω		
33	" " 4	0Ω	0Ω		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA RME PART No.	REPLACEMENT DATA	INSTALLATION NOTES
34	Bayonet	6-8V	0.15A	Brown			Type 47
35	Bayonet	6-8V	0.15A	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	RME PART No.	NOTES
36	Switch		Band
37	Switch		Change over
38	3 Gang Var. Cap.		

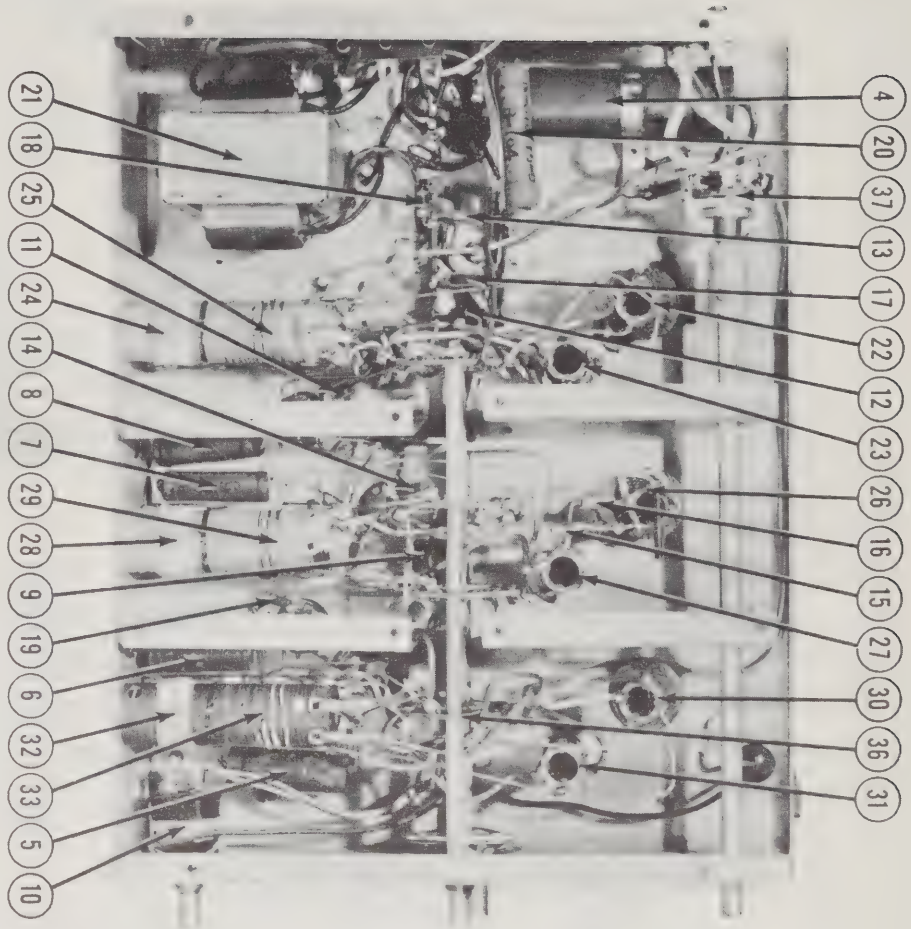
EXTERNAL CONNECTIONS

To place the DB-22A in operation, the line cord should be plugged into a suitable power source. The regular model is designed for operation on 110-120 V. 50-60 cycles AC line only. Use of the instrument on any other voltage or frequency may result in damage to the instrument. The output cable should be connected to the antenna terminals of the associated receiver. This cable has two shielded leads and a ground lead each terminated in a lug. On receivers which have provision for doublet or transmission line type of input such as the RME-45 and the RME-84 receivers, the BLUE lead connects to the outside (furthest from ground) terminal of the receiver input terminal strip. This is usually marked "A" and the RED lead is then connected to the center terminal marked "A" and the WHITE lead is connected to ground terminal "G". On receivers not equipped with three input terminals the BLUE output lead is connected to the terminal marked "A" and the RED and WHITE lead together are connected to the terminal marked "G". In some installations the cabinets of the DB-22A and associated receivers must be bonded together with a copper strap or set so their adjacent cabinet bottom edges make contact on a common metal plate to prevent oscillation at 14 MC and above.

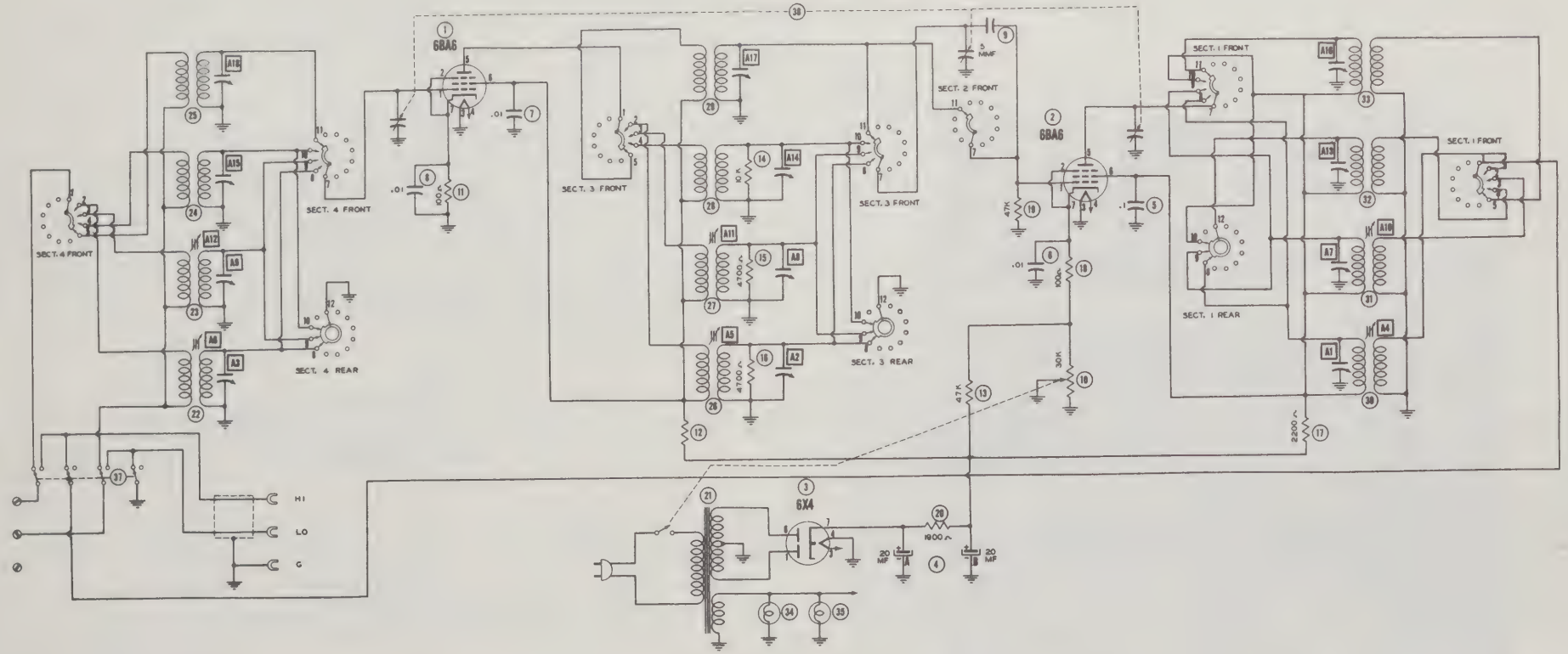
DATE 11/48-#4820-14 SET #50-FOLDER #14

RME MODEL DB-22A

CHASSIS—BOTTOM VIEW



RME MODEL DB-22A



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	6BA6	0V.	.8VDC	6.3VAC	0V.	60VDC	60VDC	.8VDC
2	6BA6	0V.	.8VDC	6.3VAC	0V.	60VDC	60VDC	.8VDC
3	6X4	110VAC	0V.	6.3VAC	0V.	0V.	110VAC	110VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	6BA6	3.5Ω	100Ω	.1Ω	0Ω	50KΩ	50KΩ	100Ω
2	6BA6	47KΩ	100Ω	.1Ω	0Ω	50KΩ	50KΩ	100Ω
3	6X4	120Ω	INF.	.1Ω	0Ω	INF.	115Ω	50KΩ

RF GAIN FULLY MAXIMUM.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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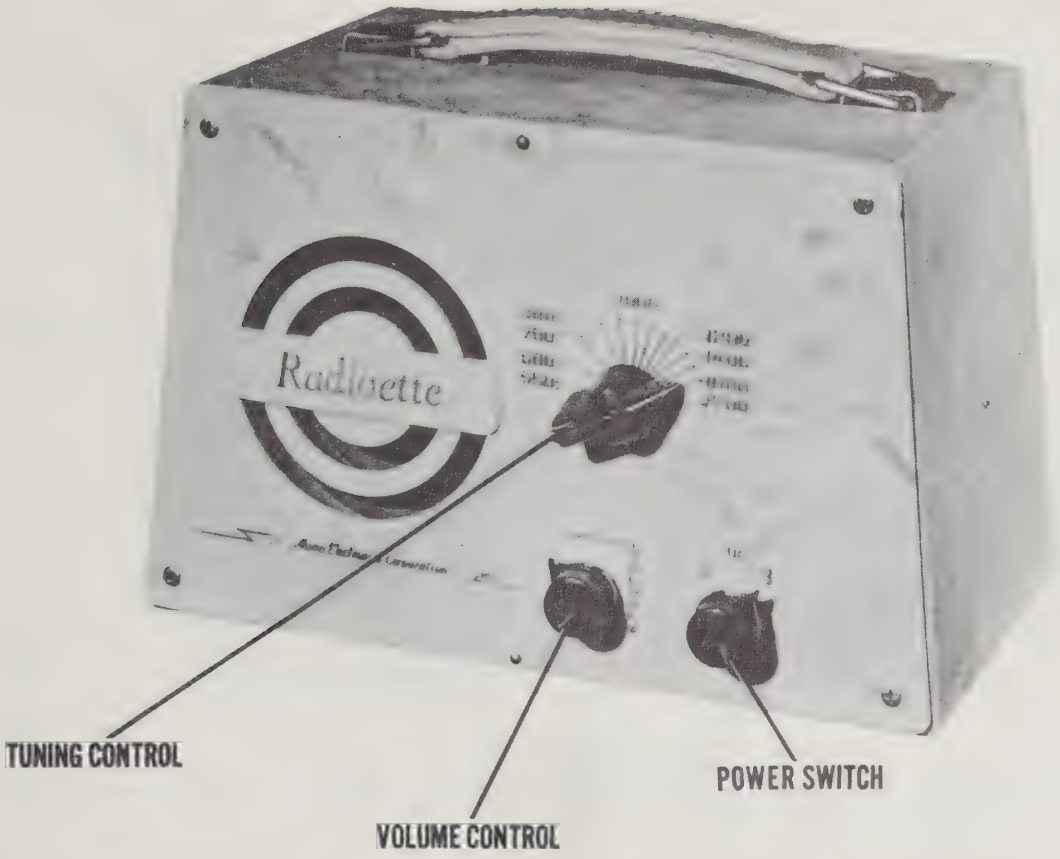
4820-14

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - No signal applied for voltage measurements.

RADIOETTE MODEL PR-2
BATTERY-LINE OPERATED



RADIOETTE MODEL PR-2
BATTERY-LINE OPERATED

RADIOETTE MODEL PR-2

TRADE NAME	Radioette, Model PR-2
MANUFACTURER	Alamo Electronics Corp., San Antonio, Texas
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1T4 IF Amp., 1S5 Det.-AVC-AF, 3Q4 Power Output
POWER SUPPLY RATING	105-120 Volts AC-DC or 4.5 Volts "A" Supply and 67.5 Volts "B" Supply .11 Amp. @ 117 Volts AC or 110 MA @ 4.5 Volts DC and 7.8 MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540-1650KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1		Loop	455KC	Tuning cap. fully open.	Across voice coil	A1, A2, A3, A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2		"	1700KC	"	"	A5	Adjust for maximum output.
3		"	1400KC	Tune for maximum output.	"	A6	Adjust for maximum output. This adjustment should be made with batteries in place and chassis as far in the cabinet as is possible and still gain access to A6.

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DATE 11/48-#4820-15 SET #50-FOLDER #15

PARTS LIST AND DESCRIPTIONS

RADIOETTE MODEL PR-2

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RADIOETTE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1T4	1T4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	3Q4	3Q4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RADIOETTE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5A	40	150		PRSA503010	EDL4415	DSB-403020	TA-440	Filter-Red
B	40	150		PRS150/40	BR2015	-150	UT-201	" "
C	20	150			BRH251		UHC102	" Yellow
D	100	25				M-100-25		Filament Bypass-Blue
6	.05	400		484-05	DT4S5	ST-4-05	TC-15	Line Filter
7	.05	600		684-05	DT6S5	ST-6-05	72P1	Line Isolation
8	.005	600		684-005	DT6D5	ST-6-005	TC-25	Output Plate Bypass
9	.01	400		484-01	DT4S1	ST-4-01	TC-11	Audio Coupling-See Note
10	.005	400		484-005	DT6D5	ST-6-005	TC-25	" " " "
11	.005	600		684-005	DT6D5	ST-6-005	TC-25	" "
12	.02	600		684-02	DT6S2	ST-6-02	TC-12	AF Screen Bypass
13	.02	600		684-02	DT6S2	ST-6-02	TC-12	RF Bypass
14	.02	600		684-02	DT6S2	ST-6-02	TC-12	Decoupling
15	.02	600		684-02	DT6S2	ST-6-02	TC-12	AVC Filter
16	.02	600		684-02	DT6S2	ST-6-02	TC-12	AVC Filter
17	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	Output Grid Bypass-Cer.
18	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter "
19	50	300		1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap. "

Note-Items #9 and 10 are used interchangeably.

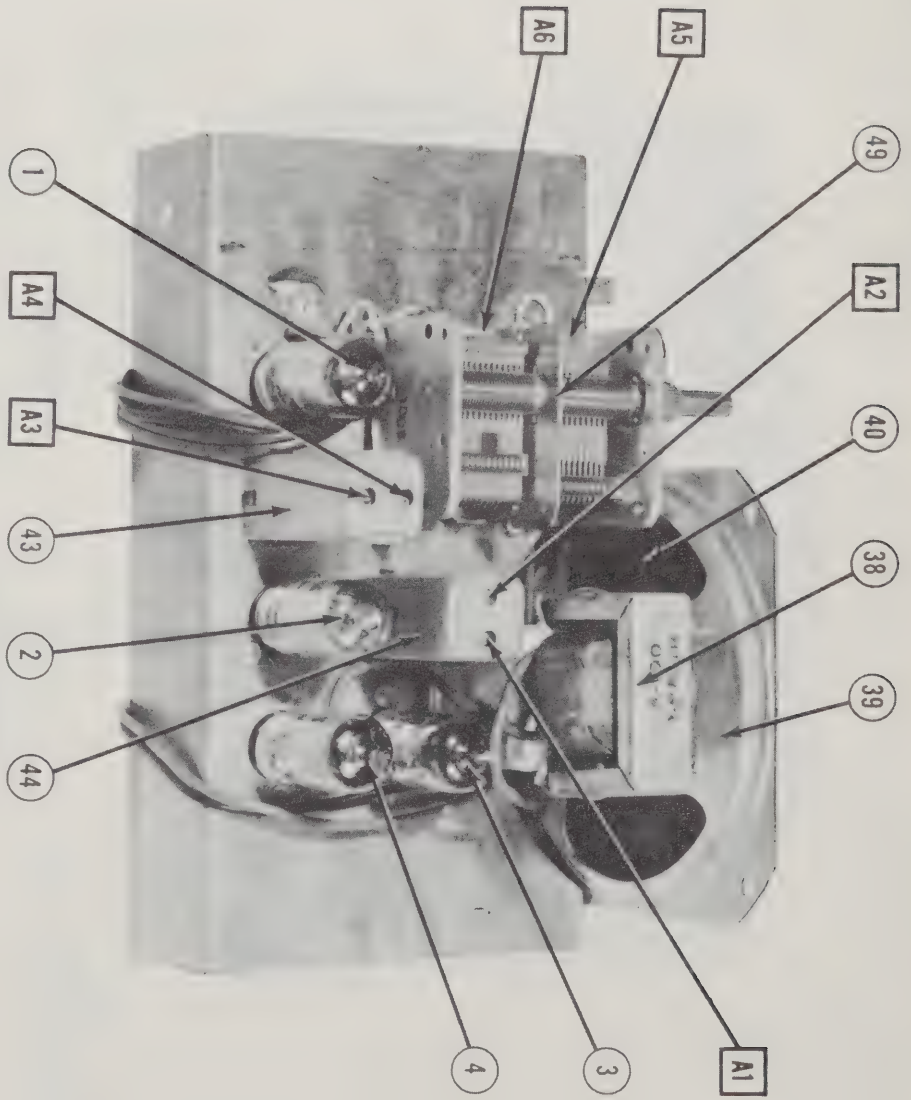
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RADIOETTE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
20A	1 Meg.	½		D13-137	M-63-Z	Volume Control
B	Shaft			A	Not Req.	Attach to 20A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RADIOETTE PART No.	IRC PART No.	IDENTIFICATION CODES
21	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Oscillator Grid
22	5.1 Meg.	½		BTS-4.7 Meg.	Grn.-Br.-Grn. AVC Network
23	5.1 Meg.	½		BTS-4.7 Meg.	Grn.-Br.-Grn. IF Grid
24	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
25	8.2 Meg.	½		BTS-8.2 Meg.	Gray-Red-Grn. AF Grid
26	3 Meg.	½		BTS-3.3 Meg.	Or.-Blk.-Grn. AF Screen Dropping
27	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
28	510KΩ	½		BTS-470K	Grn.-Br.-Yl. Output Grid
29	510Ω	½		BTS-470	Grn.-Br.-Br. Bias
30	25Ω	½		BW-½-27	Red-Grn.-Blk. Filament String
31	1300Ω	½		BTS-1200	Br.-Or.-Red " "
32	1300Ω	½		BTS-1200	Br.-Or.-Red " "
33	1200Ω	5		AB-1250	Filament Dropping
34	1200Ω	5		AB-1250	" "
35	3300Ω	1		BTA-3300	Or.-Or.-Red Filter
36	18KΩ	½		BTS-18K	Br.-Gray-Or. Converter Screen Dropping
37	100Ω	1		BW-1-100	Br.-Blk.-Br. Rectifier Ballast

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		RADIOETTE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
38	10KΩ	3.0Ω	440Ω	.5Ω		A-3879†	T22S47†	A-2932†	†Bend mounting tabs down, file out slots and mount on original bracket.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			RADIOETTE PART No.	JENSEN PART No.	QUAM PART No.	
39	FIELD	VC IMP.		ST-113		
	PM	3.0Ω		Mod. P4-X	4A07	
40	CONE DIA.	VC DIA.				
	4"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	RADIOETTE PART No.	MEISSNER PART No.	
41	Loop Ant.		1.5Ω			
42	Osc. Coil	1.8Ω	6.5Ω			
43	Input IF	16Ω	21Ω		16-6668	
44	Output IF	23Ω	23Ω		16-6669	

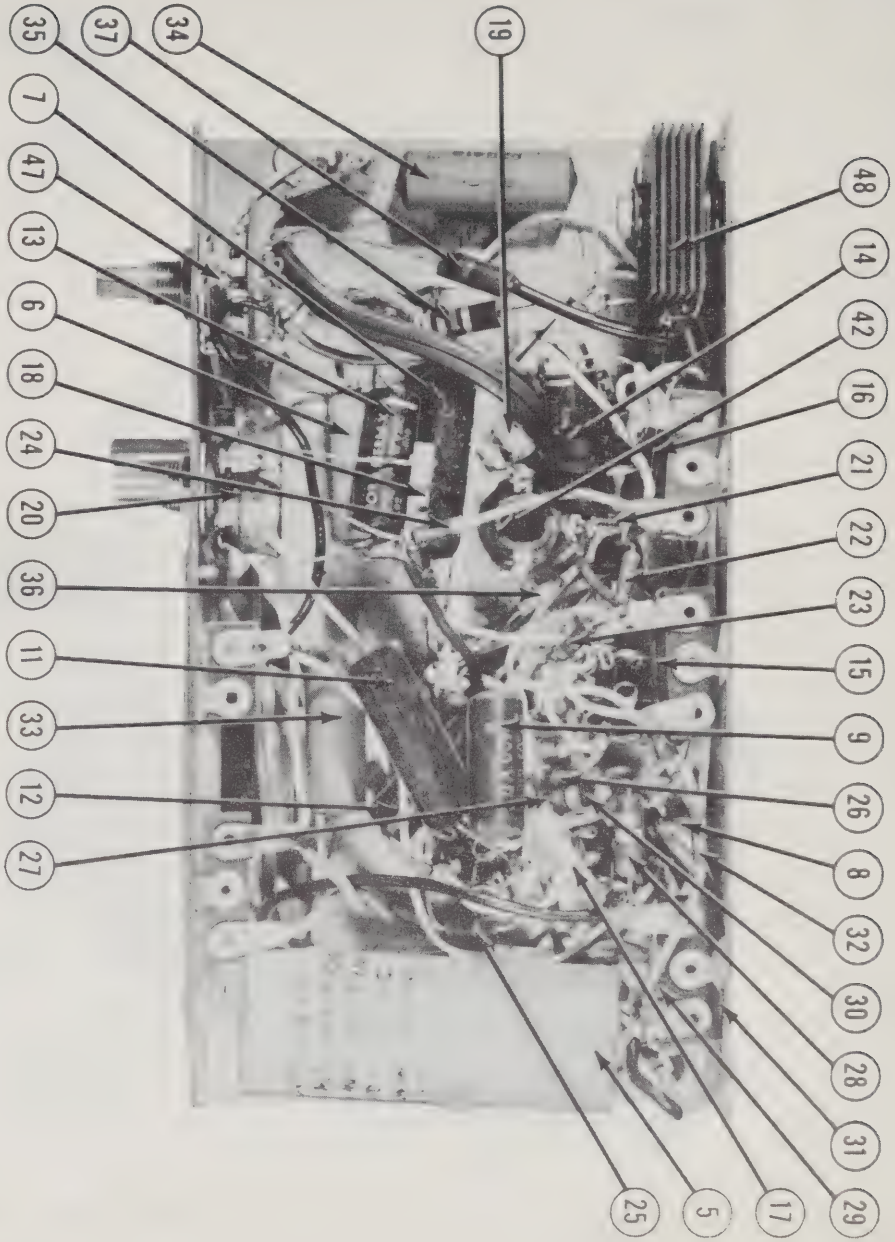
BATTERIES

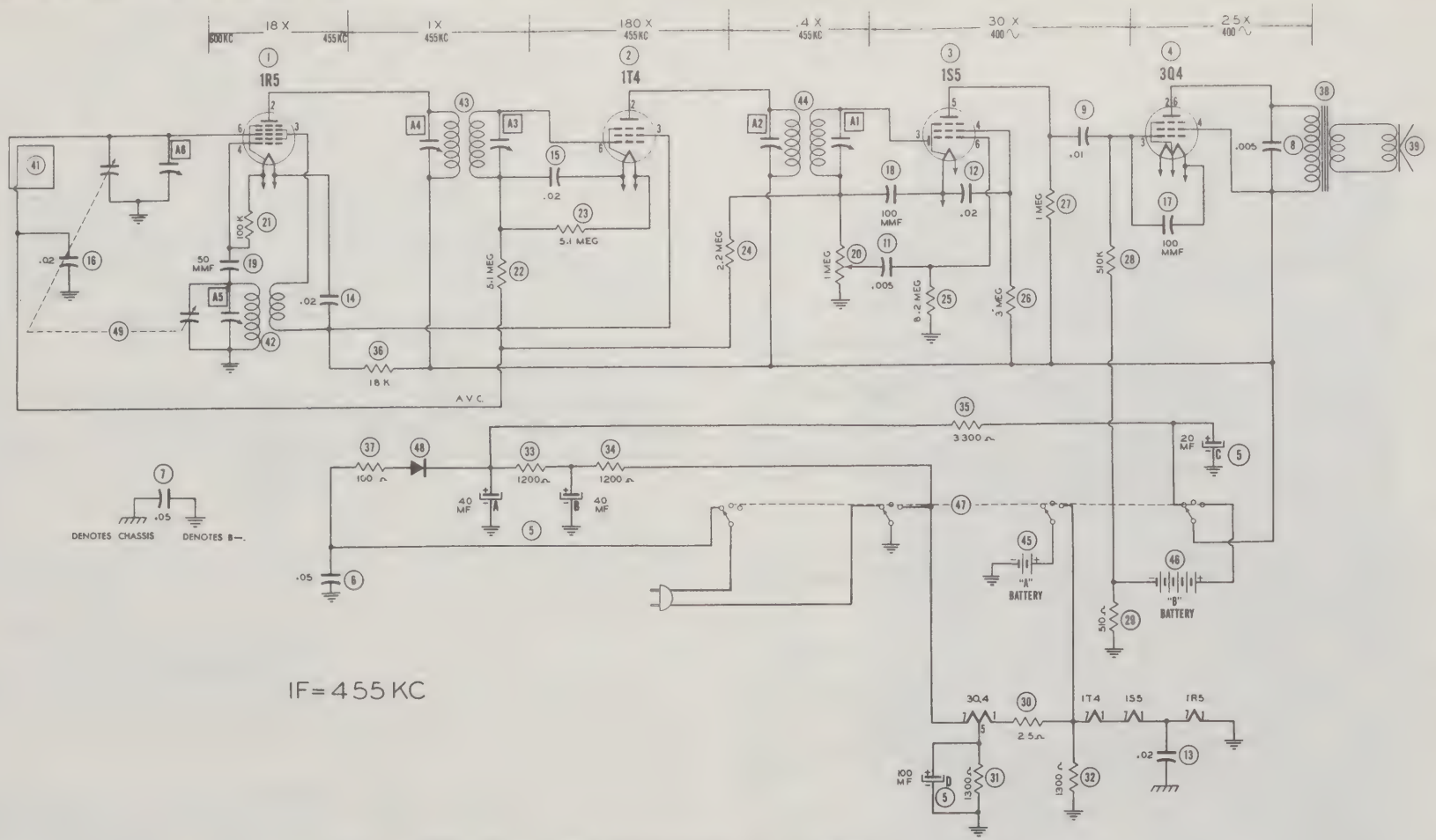
ITEM No.	VOLTAGE	RADIOETTE PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
45	4.5V "A"		950			2R			3 Used in Series
46	67.5V"B"			467			XX45		

MISCELLANEOUS

ITEM No.	PART NAME	RADIOETTE PART No.	NOTES
47	Switch		AC/DC-Batt.
48	Rectifier		Selenium
49	3 Gang Var. Cap.		(15-445MMF, 29-182MMF)

CHASSIS—BOTTOM VIEW





VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V.	75VDC	40VDC	-3.6VDC§	0V.	0V.	1.2VDC
2	1T4	2.3VDC	75VDC	40VDC	0V.	2.3VDC	.1VDC	3.6VDC
3	1S5	1.2VDC	0V.	.2VDC	2GVDC	6VDC	0V.	2.3VDC
4	3Q4	2.8VDC	73VDC	0V.	75VDC	6VDC	73VDC	2.2VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0Ω	6KΩ	24KΩ	100KΩ	0Ω	1.5 Meg.	*
2	1T4	*	6KΩ	24KΩ	INF.	*	3.5 Meg.	*
3	1S5	*	INF.	1 Meg.	3 Meg.	1 Meg.	3.2 Meg.	*
4	3Q4	*	6KΩ	510KΩ	6KΩ	*	6KΩ	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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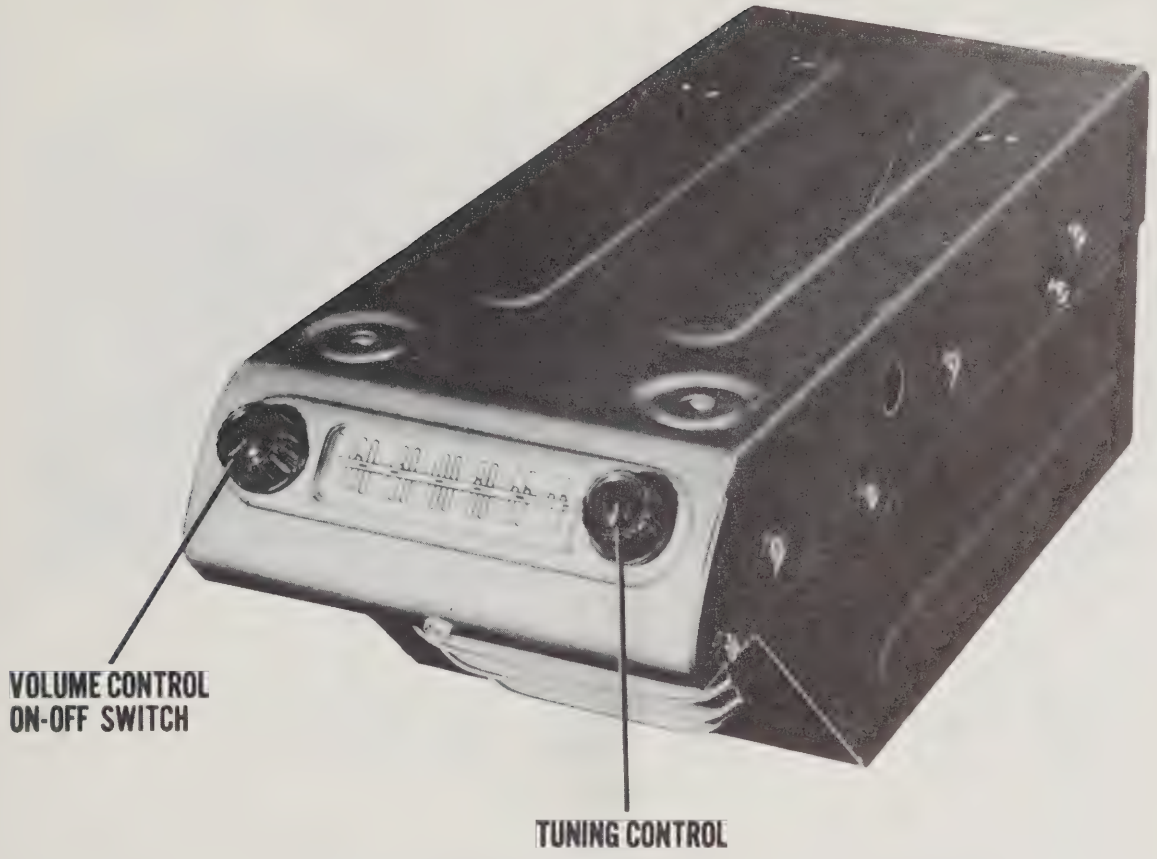
4820-15

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting across volume control.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volts.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

REGAL
MODEL CR761



REGAL
MODEL CR761

REGAL MODEL CR761

TRADE NAME	Regal, Model CR761
MANUFACTURER	Regal Electronics Corp., 605 W. 130 th St., New York, N.Y.
TYPE SET	Battery Operated Universal Automotive Superheterodyne Receiver
TUBES (SIX)	Types, 6BA6 RF Amp., 6BE6 Converter, 6BA6 IF Amp., 6AT6 or 6AV6 Det.-AVC-AF, 6AS5 Power Output, 6X4 Rectifier.
POWER SUPPLY	6 Volt Storage Battery
TUNING RANGE—BROADCAST	540-1680KC RATING 4.3 Amp. @ 6.3 Volts DC

ALIGNMENT INSTRUCTIONS

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	456KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output.
2	60MMFD.	High side to ant. socket. Low side to chassis.	"	Tuning cap. fully closed	"	A5	Adjust for minimum output.
3	60MMFD.	"	1680KC	Tuning cap. fully open.	"	A6	Adjust for maximum output.
4	60MMFD.	"	1350KC	Tune for maximum output.	"	A7	" " " "

INSTALL RECEIVER IN CAR WITH ANTENNA FULLY EXTENDED. TUNE IN WEAK STATION NEAR 1350KC AND ADJUST A7 FOR MAXIMUM VOLUME.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: REGAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6BA6	6BA6	7BK	
2	Converter	6BE6	6BE6	7CH	
3	IF Amp.	6BA6	6BA6	7BK	
4A	Det.-AVC-AF	6AT6	6AT6	7BT	
B	" " "	6AV6	6AV6		
5	Power Output	6AB5	6AB5		
6	Rectifier	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: REGAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	20	200	60-109	AF43F4A	UP15C25C	DY-309	EL-334	■ Filter
B	20	200						▲ "
C	20	25						Cathode Bypass
8	.5	120	50-117		DT2P5	SHH-1		Hash Filter
9	.5	120	50-117		DT2P5	SHH-1		" "
10	.004	1600	50-118	1684-004	MD16D4	STM-16-004	TR-24	Buffer
11	.022	600		684-02	DT6S2	ST-6-02	TC-12	Output Plate Bypass
12	.01	400	50-102	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
13	.01	400	50-102	484-01	DT4S1	ST-4-01	TC-11	" "
14	.068	200		484-06	DT4S6	ST-6-06	TC-16	Decoupling
15	.068	200		484-06	DT4S6	ST-6-06	TC-16	Screen Decoupling
16	.068	200		484-06	DT4S6	ST-6-06	TC-16	AVC Filter
17	.02	200		484-02	DT2S2		TC-12	Antenna Coupling
18	250	500	55-103	1468-00025	5W5T25	MO.5-325	1FM-325	RF Bypass
19	250	500	55-103	1468-00025	5W5T25	MO.5-325	1FM-325	" "
20	250	500	55-103	1468-00025	5W5T25	MO.5-325	1FM-325	Diode RF Filter
21	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	" " "
22	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.
23	100	500	55-102	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: REGAL PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
24A	500KΩ	½	20-103X	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 24A as per instructions
C	Switch		" "	41	SW-A	" " " " " "

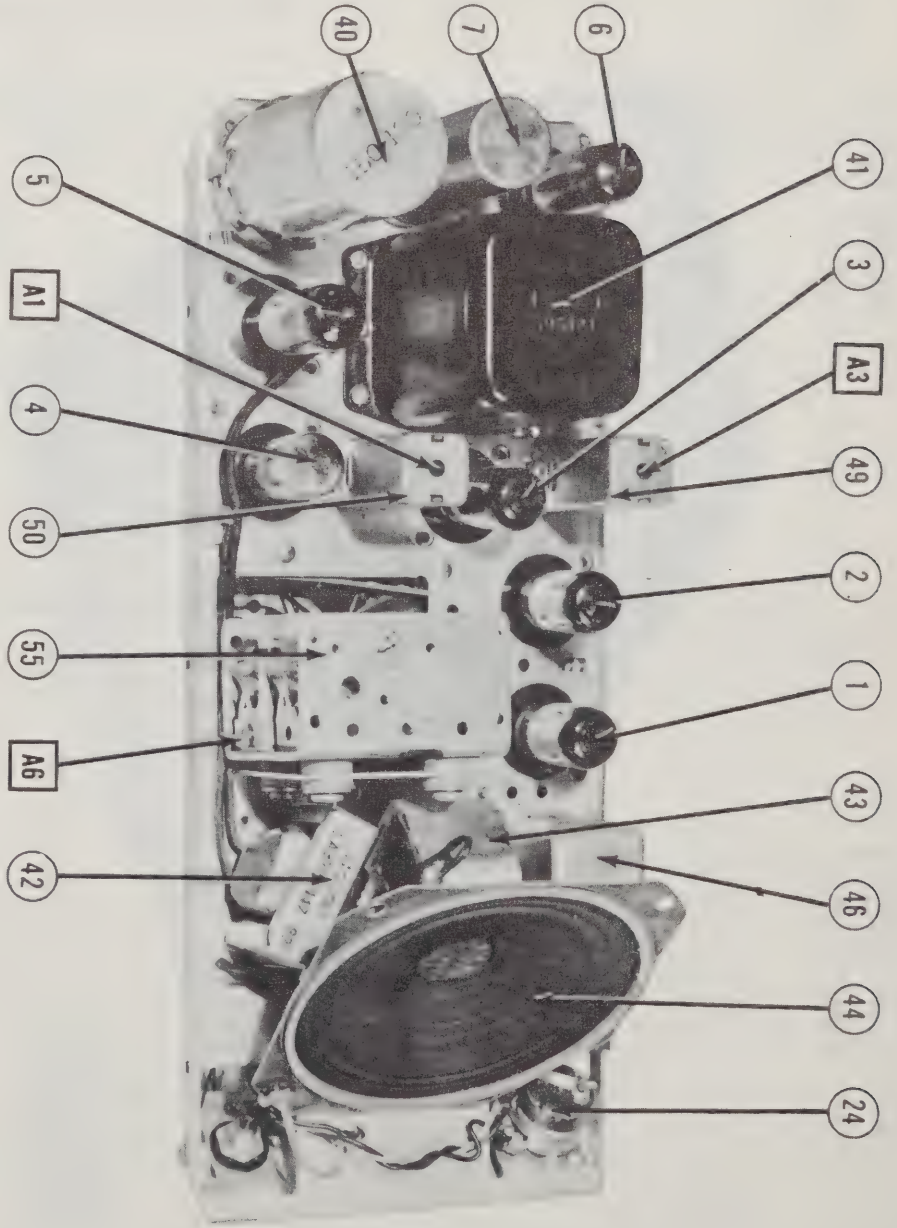
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: REGAL PART No.	IRC PART No.	IDENTIFICATION CODES
25	6800Ω	½	65-131	BTS-6800	Br.-Gray-Red RF Plate
26	100KΩ	½	65-124	BTS-100K	Br.-Blk.-Yl. Conv. Grid
27	22KΩ	½		BTS-22K	Red-Red-Or. Osc. Grid
28	100Ω	1	65-175	BW-1-100	Br.-Blk.-Br. IF Cathode
29	1 Meg.	½	65-126	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
30	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Diode Filter
31	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
32	220KΩ	½	65-108	BTS-220K	Red-Red-Yl. AF Plate Load
33	220KΩ	½	65-108	BTS-220K	Red-Red-Yl. Output Grid
34	240Ω	½	65-159	BW-½-220	Red-Yl.-Br. Output Cathode
35	2200Ω	½		BTS-2200	Red-Red-Red Voltage Dropping
36	6800Ω	½	65-131	BTS-6800	Blue-Gray-Red Screen
37	2200Ω	2		5T-2-2200	Red-Red-Red Filter
38	240Ω	½	65-159	BW-½-220	Red-Yl.-Br. Hash Suppressor
39	240Ω	½	65-159	BW-½-220	Red-Yl.-Br. " "

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA: REGAL PART No.	REPLACEMENT DATA: RADIART PART No.	INSTALLATION NOTES
40	Interrupter	6.3V DC	115∿		5301	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	REGAL PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
41	6.3V CT @ 1.8A	320V CT @ .04A			140-11	P-6301‡#		P-2969#

#Drill new mounting holes. ‡Adjust value of buffer condenser if necessary.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		REGAL PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
42	2300Ω	3.8Ω	200Ω	.6Ω	110-108T	A-3876	T22845	A-2928	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			REGAL PART No.	JENSEN PART No.	QUAM PART No.	
43	FIELD	VC IMP.	110-108	ST-113†	4A07†	†Trim flange, fabricate new mounting bracket.
	PM	3.8Ω		Mod. P4-X		
44	CONE DIA.	VC DIA.				
	4"	9/16"				

R F COILS

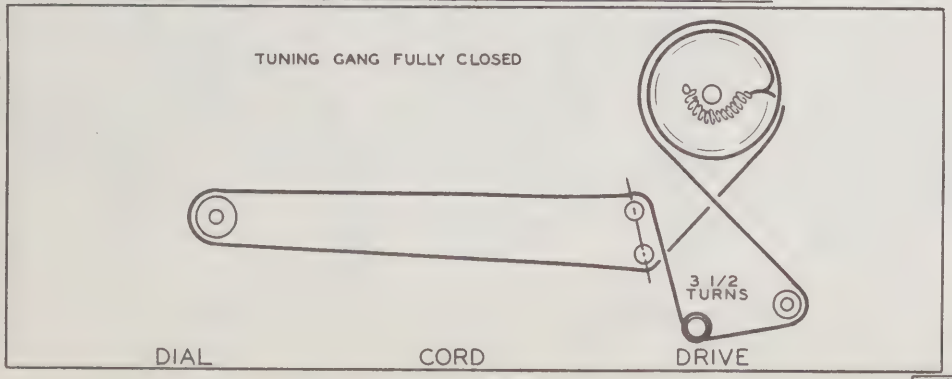
ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	REGAL PART No.	MEISSNER PART No.
45	Ant. Loading Coil		.5Ω		
46	Ant. Coil		2.5Ω	30-143	
47	Wave Trap		53Ω	30-151	
48	Osc. Coil		7Ω		
49	Input IF	15.5Ω	15Ω	30-154	16-6678
50	Output IF	10Ω	9.7Ω	30-155	16-6678
51	Fil. Choke		0Ω	140-109	
52	Vib. Choke		0Ω	140-110	

DIAL LIGHT

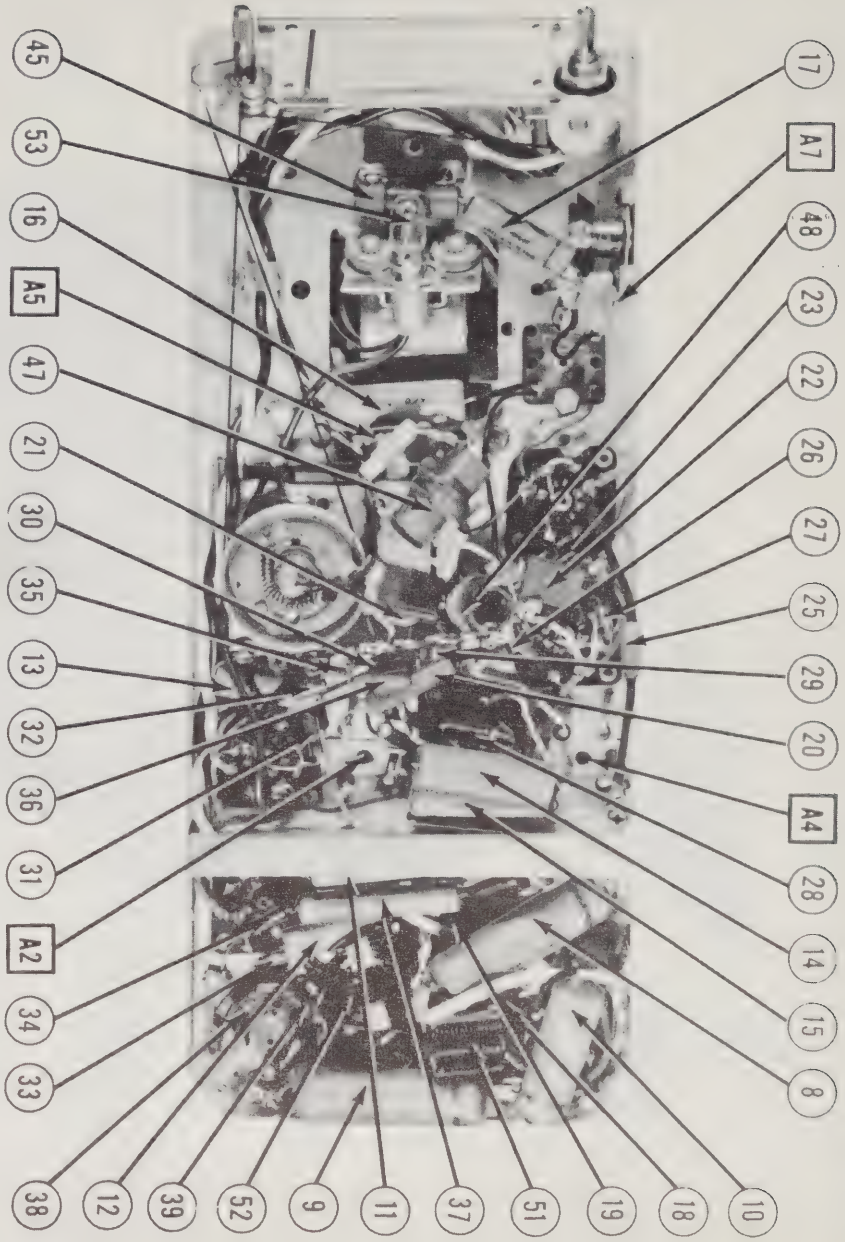
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					REGAL PART No.		
53	Bayonet	6-8	0.15	Brown			Type 47

MISCELLANEOUS

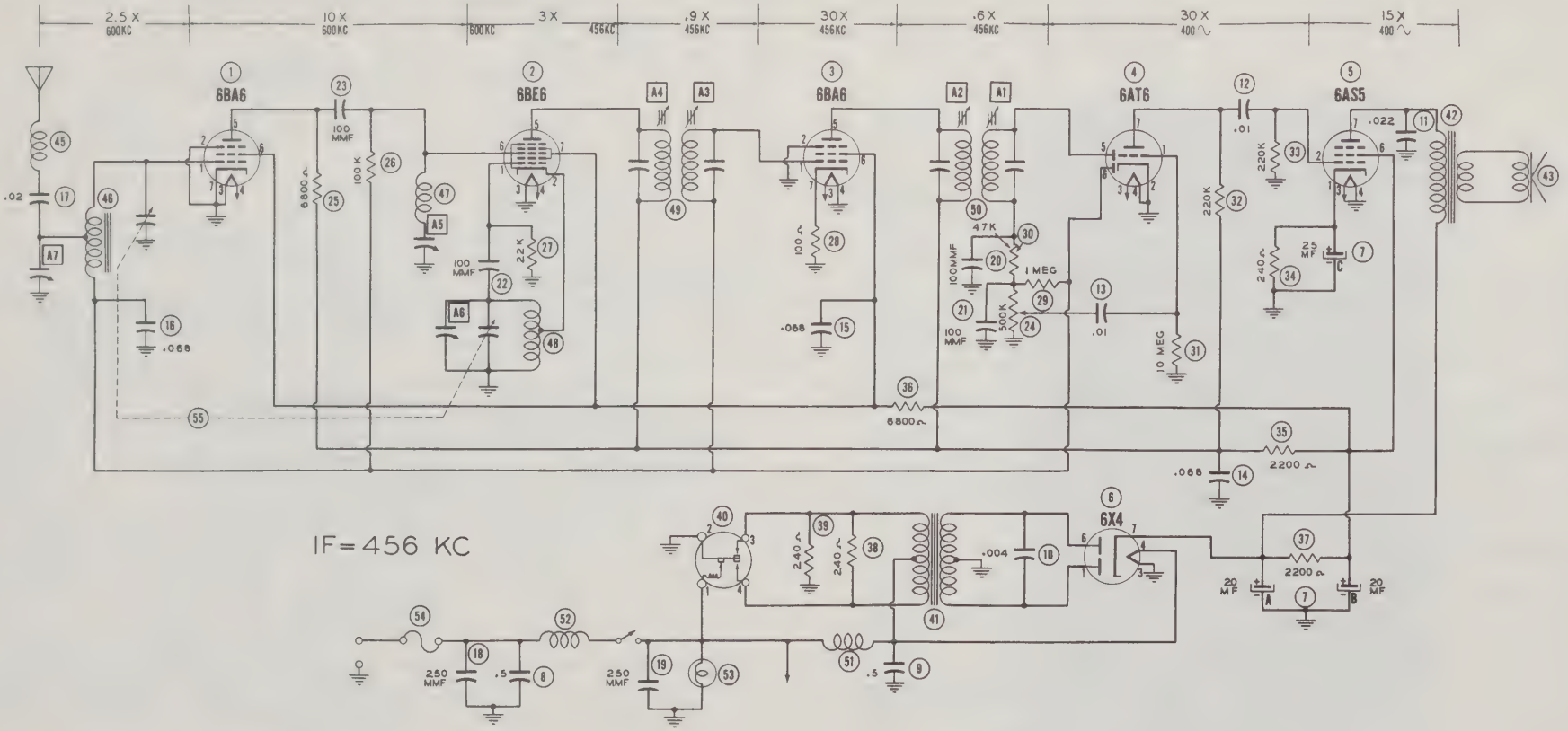
ITEM No.	PART NAME	REGAL PART No.	NOTES
54	Fuse		15 Amp.
55	3 Gang Var. Cap	40-111	(13-412MMF, 41-210MMF)



CHASSIS—BOTTOM VIEW



REGAL MODEL CR761



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	6BA6	-.1VDC	0V.	0V.	6.1V.C	53VDC	43VDC	0V.
2	6BE6	-3.4VDC	0V.	0V.	6.1VDC	73VDC	43VDC	-.7VDC
3	6BA6	-.1VDC	0V.	0V.	6.1VDC	73VDC	43VDC	.2VDC
4	6AT6	-.6VDC	0V.	0V.	6.1VDC	-.6VDC	-.1VDC	45VDC
5	6AS5	7VDC	0V.	0V.	6.1VDC	0V.	97VDC	123VDC
6	6X4	160VAC	0V.	0V.	0VDC	0V.	160VAC	127VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	6BA6	1.5 Meg.	0Ω	0Ω	.1Ω	60KΩ	80KΩ	0Ω
2	6BE6	22KΩ	1Ω	0Ω	.1Ω	75KΩ	80KΩ	1.6 Meg.
3	6BA6	1.5 Meg.	0Ω	0Ω	.1Ω	75KΩ	80KΩ	100Ω
4	6AT6	10 Meg.	0Ω	0Ω	.1Ω	550KΩ	1.5 Meg.	300KΩ
5	6AS5	250Ω	220KΩ	0Ω	.1Ω	INF.	72KΩ	70KΩ
6	6X4	350Ω	INF.	0Ω	.1Ω	INF.	400Ω	70KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY
ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

THE COOPERATION OF THE MANUFACTURER OF THIS
RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4820-16

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.

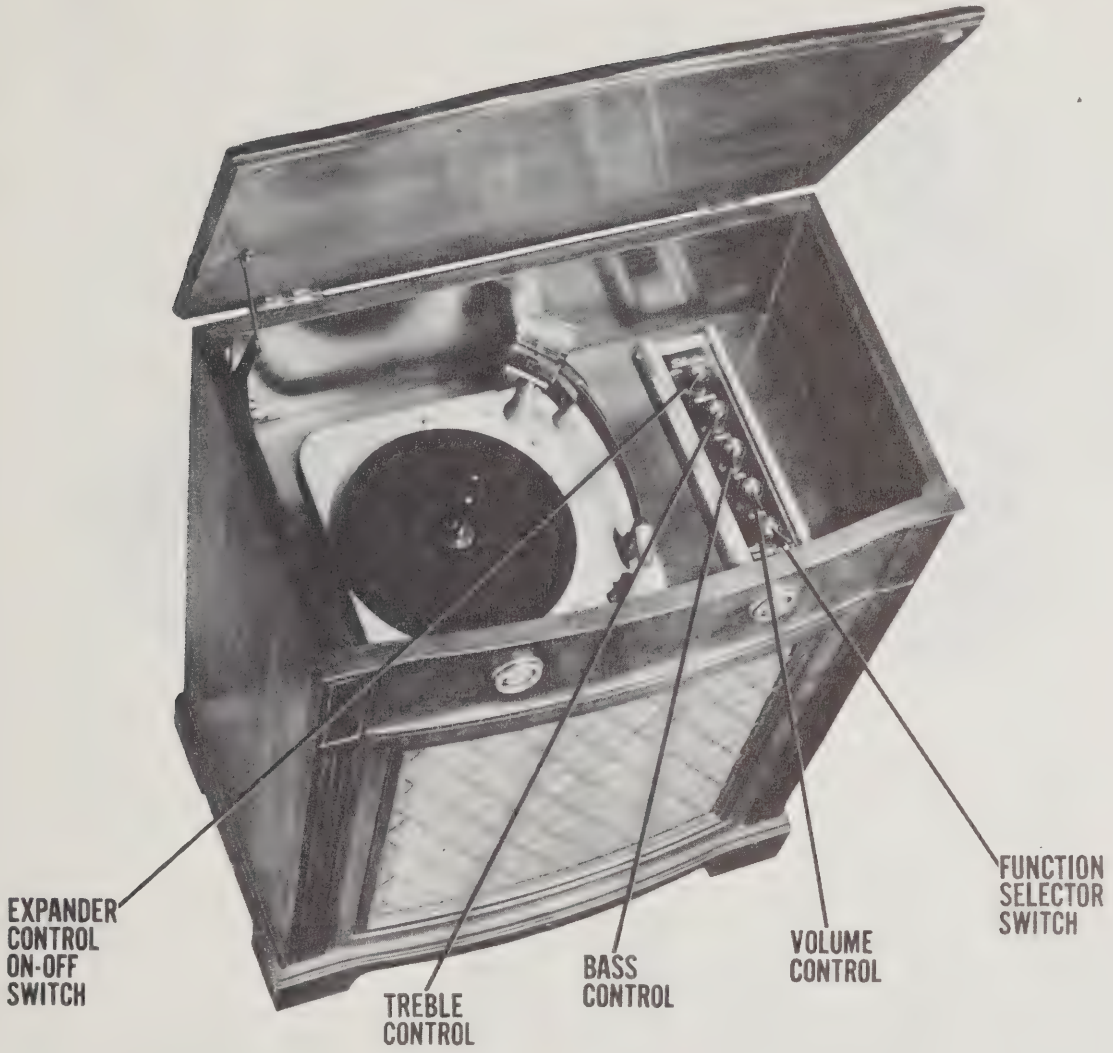
1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 6.3 volts for voltage readings
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

*TRADE MARK

SILVERTONE MODELS 8160 (Ch. 109.636), 8160A (Ch.109.636A)

SILVERTONE MODELS 8160 (Ch. 109.636), 8160A (Ch.109.636A)



SILVERTONE MODEL 8160A

TRADE NAME	Silvertone, 8160 (Ch. 109.636), 8160A (Ch. 109.636A)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan St., Chicago, Ill.
TYPE SET	AC Operated Audio Amplifier with Automatic Record Changer
TUBES (SIX)	Types, 7B6 1st AF Amp., 7B6 2nd AF Amp., 7F7 AF-Phase Inv., (2) 6L6G Power Output, 5U4G Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	1.15 Amp. @ 117 Volts AC

SILVERTONE MODELS 8160 (Ch. 109.636), 8160A (Ch.109.636A)

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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DATE 11/48-#4820-17 SET #50-FOLDER #17

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SILVERTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	1st AF Amp.	7B6	7B6	8W	
2	2nd AF Amp.	7B6	7B6	8W	
3	AF & Phase Inv.	7F7	7F7	8AC	
4	Power Output	6L6G	6L6G	7AC	
5	" "	6L6G	6L6G	7AC	
6	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7	40	450	DA55488	AF8J	UP4045	DY-40-450	EL-4	Filter
8	40	450	DA55488	AF8J	UP4045	DY-40-450	EL-4	"
9A	15	400	DA51356	AF44J4A	UP2245C	DY312	EL-322	▲ Decoupling
B	20	300						■ "
C	20	25						Cathode Bypass
10	15	300	DA55489	AF3G	UP1535	DY-20-350	EL-203	Decoupling
11	20	25	DA55522	PRS25/25	BR202A	M-25-25	TA-25	1st Audio Cath.Byp.-Note1
12	.05	400		484-05	DT4S5	MPH-4-05	TC-15	Line Filter
13	.006	600	DA55492	684-006	DT6D6	ST-6-006	TC-26	Tone Compensation
14	.006	600	DA55492	684-006	DT6D6	ST-6-006	TC-26	" "
15	.02	400		484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
16	.02	400		484-02	DT4S2	ST-4-02	TC-12	" "
17	.002	600	DBD61M202	684-002	DT6D2	ST-6-002	TC-22	" "
18	.02	400		484-02	DT4S2	ST-4-02	TC-12	Tone Compensation
19	.002	600	DBD61A202	684-002	DT6D2	ST-6-002	TC-22	" "
20	.001	600	DBD61M102	684-001	DT6D1	ST-6-001	TC-21	Audio Coupling
21	.005	600		684-005	DT6D5	ST-6-005	TC-25	Tone Compensation
22	.001	600	DBD61M102	684-001	DT6D1	ST-6-001	TC-21	" "
23	.02	400		484-02	DT4S2	ST-4-02	TC-12	" "
24	.001	600	DBD61M102	684-001	DT6D1	ST-6-001	TC-21	1st AF Plate Bypass
25	.005	600	DBD510502	684-005	DT6D5	ST-6-005	TC-25	" " " "
26	.01	400	DBD410103	484-01	DT4S1	ST-4-01	TC-11	Tone Compensation
27	.02	400		484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
28	470	500	DBM74A471	1468-0005	5W5T5	MO.5-35	1FM-35	Tone Compensation
29	1000	500		1467-001	1W5D1	MW.5-21	1FM-21	" "
30	1000	500		1467-001	1W5D1	MW.5-21	1FM-21	" "
31	220	500	DBM74A221	1468-0002	5W5T2	MO.5-32	1FM-32	" "
32	220	500	DBM74A221	1468-0002	5W5T2	MO.5-32	1FM-32	" " -Note 2

Note 1-Not used in all models.
Note 2-Some models use .01-400 in this application.

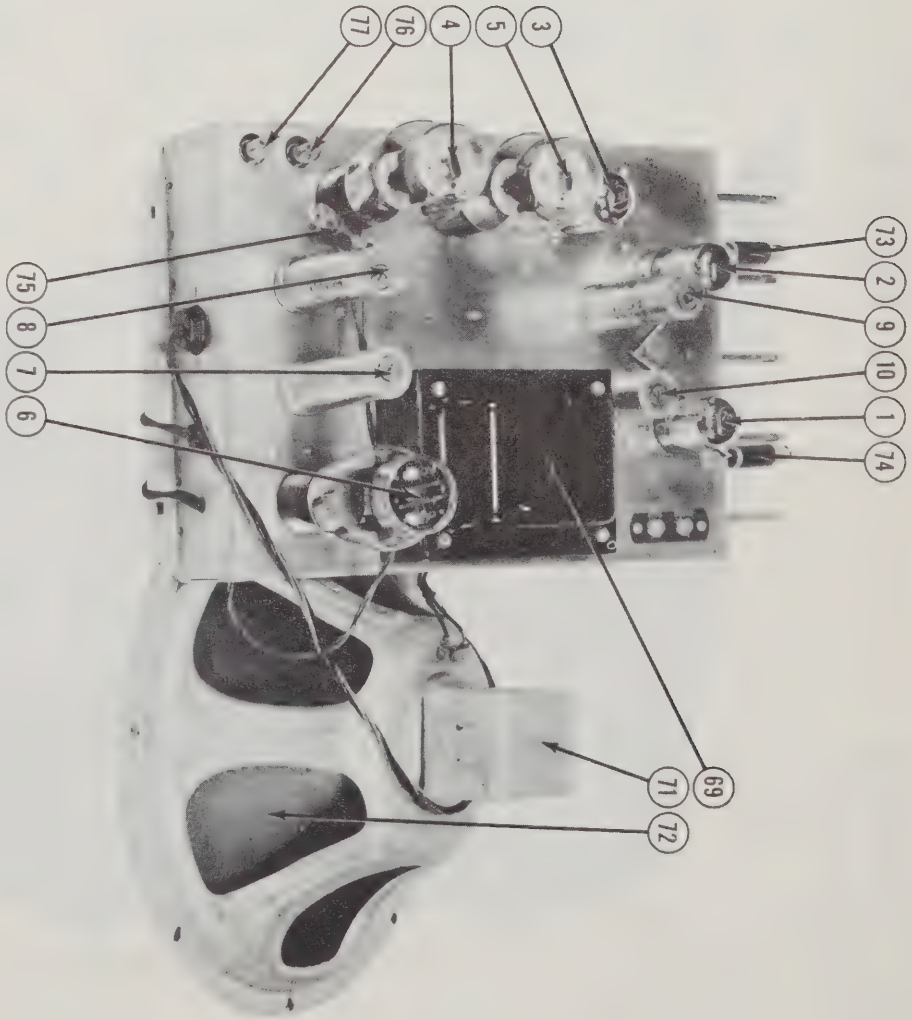
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SILVERTONE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
33A	500KΩ	½	DB55554-1	D18-133X	AT-88	Volume Control tapped @ 50KΩ
B	Shaft		Not Req.	E	KSS-3	Attach to 33A per instructions
34A	500KΩ	½	DB55565-1	D13-133	AM-60-Z	Bass Control
B	Shaft		Not Req.	E	KSS-3	Attach to 34A per instructions
35A	500KΩ	½	DB55565-1	D13-133	AM-60-Z	Treble Control
B	Shaft		Not Req.	E	KSS-3	Attach to 35A per instructions
36	100Ω	1	DB55579-1			Expander Control & Sw.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SILVERTONE PART No.	IRC PART No.	IDENTIFICATION CODES
37	15KΩ	½		BTS-15K	Br.-Grn.-Or. Tone Compensation
38	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. " " -See Note 1
39	4700Ω	½		BTS-4700	Yl.-Vi.-Red 1st AF Cathode
40	220KΩ	½		BTS-220K	Red-Red-Yl. 1st AF Plate Load
41	220KΩ	½		BTS-220K	Red-Red-Yl. Tone Compensation
42	15KΩ	½		BTS-15K	Br.-Grn.-Or. " "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	SILVERTONE PART No.	IRC PART No.	
43	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 2nd AF Grid
44	4700Ω	½		BTS-4700	Yl.-Vi.-Red 2nd AF Cathode
45	220KΩ	½		BTS-220K	Red-Red-Yl. 2nd AF Plate Load
46	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Tone Compensation
47	1.8 Meg.	½		BTS-1.8 Meg.	Br.-Gray-Grn. " "
48	1.8 Meg.	½		BTS-1.8 Meg.	Br.-Gray-Grnl " "
49	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. " "
50	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Decoupling-See Note 2
51	15KΩ	½		BTS-15K	Br.-Grn.-Or. "
52	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. 3rd AF Grid
53	2200Ω	1		BTA-2200	Red-Red-Red 3rd AF Cathode
54	330KΩ	½		BTS-330K	Or.-Or.-Yl. 3rd AF Plate Load
55	220KΩ	½		BTS-220K	Red-Red-Yl. Phase Inv. Grid
56	2200Ω	1		BTA-2200	Red-Red-Red Phase Inv. Cathode
57	330KΩ	½		BTS-330K	Or.-Or.-Yl. Phase Inv. Plate Load
58	1000Ω	½		BTS-1000	Br.-Blk.-Red Tone Compensation
59	1000Ω	½		BTS-1000	Br.-Blk.-Red " "
60	220KΩ	½		BTS-220K	Red-Red-Yl. Output Grid
61	270KΩ	½		BTS-270K	Red-Vi.-Yl. " "
62	125Ω	10	DB55510-1	ABA-150	Output Cathode-See Note 3
63	4700Ω	2		BT-2-4700	Yl.-Vi.-Red Tone Compensation
64	4700Ω	2		BT-2-4700	Yl.-Vi.-Red " "
65	40Ω	5	DB51833-2	ABA-50	Vol. Exp. Net-See Note 4
66	15KΩ	1		BTA-15K	Br.-Grn.-Or. Decoupling
67	25KΩ	10		AB-25K	Bleeder
68	2500Ω	5	DB55510-2	AB-2500	Filter

Note 1-Some models use 2.2 Meg. ½ W. in this application.
Note 2-Some models use two 100KΩ ½ Watt res. in parallel in this application.
Note 3-On IRC replacement, set slider 125Ω from end.
Note 4-On IRC replacement, set slider 40Ω from end.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	SILVERTONE PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
69	117V AC @ 1.15A	710V CT @ 165MA	5.1V AC @ 3.0A	6.4V AC @ 3.1A	DC-60214	P-6314	T22R07	P-2955#

#Add series resistor to reduce plate voltage.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		SILVERTONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
70	3650Ω CT	12.3Ω tapped @ 4.0Ω	200Ω	1.5Ω tapped @ .7Ω	DC-60215				

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			SILVERTONE PART No.	JENSEN PART No.	QUAM PART No.	
71	FIELD	VC IMP.	DC-60212-1	ST-102	12A6	
	PM	8.3Ω		Mod. P12-S		
72	CONE DIA.	VC DIA.				
	11-7/8"	1-1/4"				

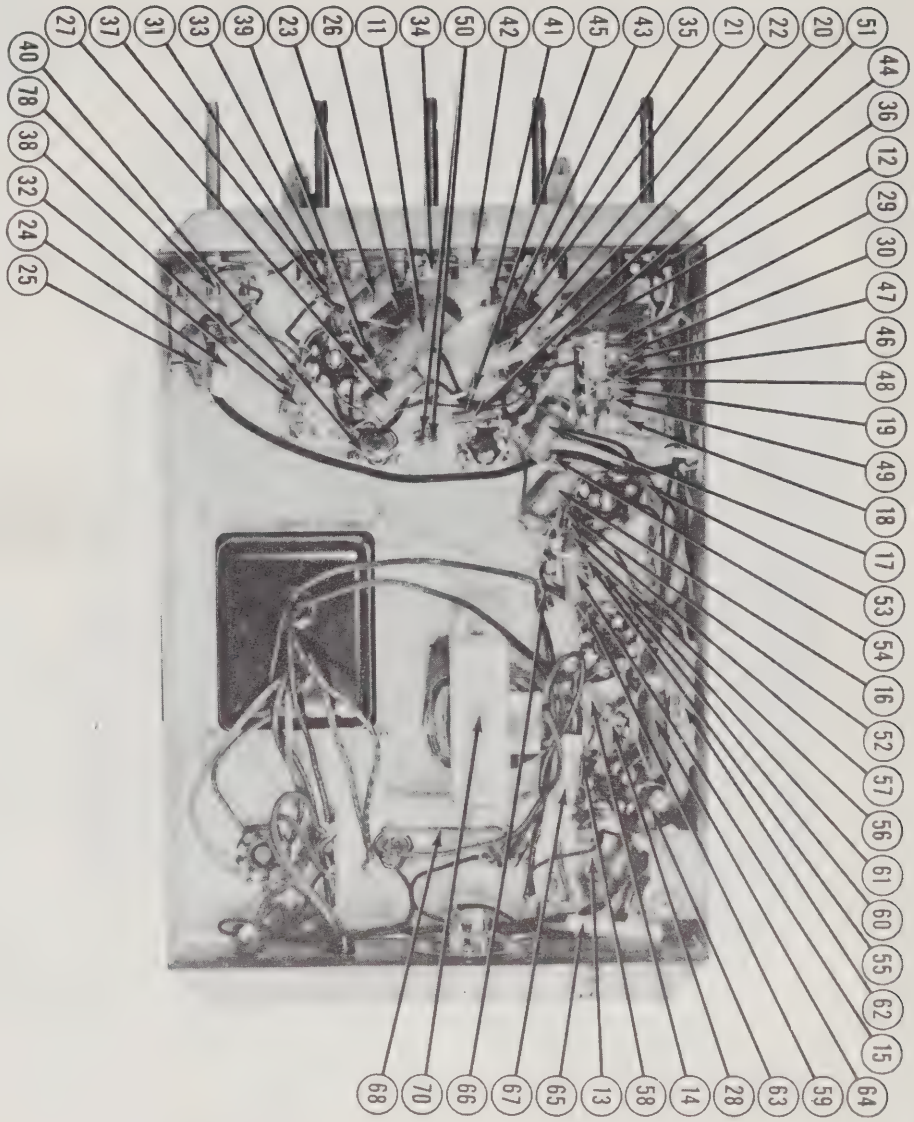
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					SILVERTONE PART No.		
73-77	Bayonet	6-8	0.15	Brown			Type 47

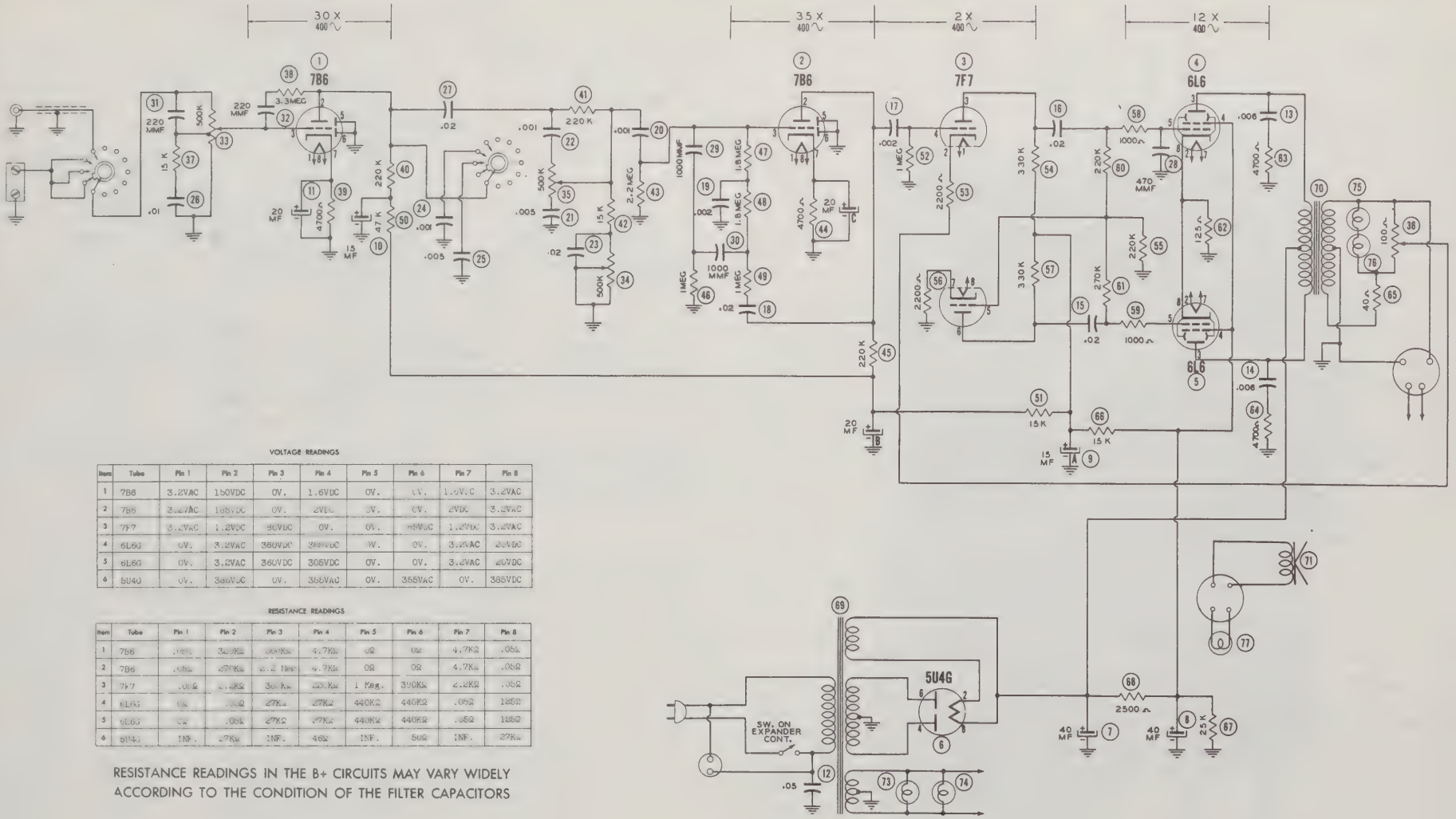
MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
78	Switch Knob	DB55503-1 DC60229-1	Function (with Indicator Dot)

CHASSIS—BOTTOM VIEW



SILVERTONE MODEL 816A



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7B6	3.2VAC	150VDC	0V.	1.6VDC	0V.	0V.	1.6V.C	3.2VAC
2	7B6	3.2VAC	165VDC	0V.	2VDC	0V.	0V.	2VDC	3.2VAC
3	7F7	3.2VAC	1.2VDC	90VDC	0V.	0V.	85VDC	1.2VDC	3.2VAC
4	6L6G	0V.	3.2VAC	360VDC	305VDC	0V.	0V.	3.2VAC	20VDC
5	6L6G	0V.	3.2VAC	360VDC	305VDC	0V.	0V.	3.2VAC	20VDC
6	5U4G	0V.	385VAC	0V.	355VAC	0V.	355VAC	0V.	385VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7B6	.05Ω	320KΩ	300KΩ	4.7KΩ	0Ω	0Ω	4.7KΩ	.05Ω
2	7B6	.05Ω	270KΩ	2.2 Meg.	4.7KΩ	0Ω	0Ω	4.7KΩ	.05Ω
3	7F7	.05Ω	1.2KΩ	300KΩ	220KΩ	1 Meg.	390KΩ	1.2KΩ	.05Ω
4	6L6G	0Ω	.05Ω	27KΩ	27KΩ	440KΩ	440KΩ	.05Ω	125Ω
5	6L6G	0Ω	.05Ω	27KΩ	27KΩ	440KΩ	440KΩ	.05Ω	125Ω
6	5U4G	INF.	27KΩ	INF.	46Ω	INF.	50Ω	INF.	27KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controlsat minimum for voltage measurements.

SPARTON MODEL 4AW17 (Ch. 417)
BATTERY OPERATED

SPARTON MODEL 4AW17 (Ch. 417)
BATTERY OPERATED

SPARTON MODEL 4AW17

TRADE NAME	Sparton, Model 4AW17 (Ch. 417)
MANUFACTURER	Sparks-Withington Co., Jackson, Mich.
TYPE SET	Battery Operated Portable Superheterodyne Receiver
TUBES (FOUR)	Types, 1R5 Converter, 1T4 IF Amp., 1S5 Det.-AVC-AF, 3Q4 Power Output
POWER SUPPLY	9 Volts "A" Supply and 90 Volts "B" Supply
RATING	50 MA @ 9 Volts DC and 13 MA @ 90 Volts DC
TUNING RANGE—BROADCAST	550-1680KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Standard RMA dummy antenna consists of a 200 MMFD capacitor in series with a 20 Millihenry Choke, the choke being shunted by a 400 MMFD capacitor in series with a 400Ω carbon resistor.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.02 MFD.	High side to Pin 6 (grid) of 1R5. Low side to chassis.	456KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output.
2	.02 MFD	High side to ant. lead. Low side to chassis.	"	Tuning cap. fully closed.	"	A5	Adjust for minimum output.
3	RMA Dummy (See prealignment notes)	"	1500KC	1500KC	"	A6	Adjust for maximum output.
4	"	"	"	Tune for maximum output.	"	A7	Adjust for maximum output. Check calibration at 1000KC & 600KC.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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DATE 11/48-#4820-18 SET #50-FOLDER #18

PARTS LIST AND DESCRIPTIONS

SPARTON MODEL 4AW12

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SPARTON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1T4	1T4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	3Q4	3Q4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SPARTON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5	10	25	A9004-1	PRS25/10	BR102A	M-10-25	TA-10	Fil. Bypass
6	.1	200	B9002GK104	484-.1	DT2P1	ST-2-1	TC-1	RF Bypass Pwr. Supply
7	.05	200	B9002GK503	484-05	DT2S5	ST-4-05	TC-15	" " " " -Note
8	.005	200	B9002GK502	484-005	DT6D5	ST-6-005	TC-25	Output Plate Bypass "
9	.01	200	B9002FK103	484-01	DT2S1	ST-4-01	TC-11	Audio Coupling
10	.004	200	B9002FK402	484-004	DT6D4	ST-6-004	TC-24	" "
11	.01	200	B9002FK103	484-01	DT2S1	ST-4-01	TC-11	AF Screen Bypass
12	.05	200	B9002GK503	484-05	DT2S5	ST-4-05	TC-15	Fil. Bypass
13	.1	200	B9002GK104	484-.1	DT2P1	ST-2-1	TC-1	" "
14	.05	200	B9002GK503	484-05	DT2S5	ST-4-05	TC-15	Screen Decoupling
15	.05	200	B9002GK503	484-05	DT2S5	ST-4-05	TC-15	Fil. Bypass
16	.05	200	B9002GK503	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
17	50	500	B9001G500	1468-00005	5W5Q5	M0.5-45	1FM-45	AF Plate Bypass
18	240	500	B9001G241	1468-00025	5W5T25	M0.5-325	1FM-325	Diode RF Filter
19	47	500	A9011-1	1468-00005	5W5Q5	M0.5-45	1FM-45	Osc. Grid Cap.-Note

Note-Not used in all models.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SPARTON PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
20A	1 Meg.	½	A18003-1	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 20A per instructions
C	Switch		" "	42	SW-A2	" " " " "

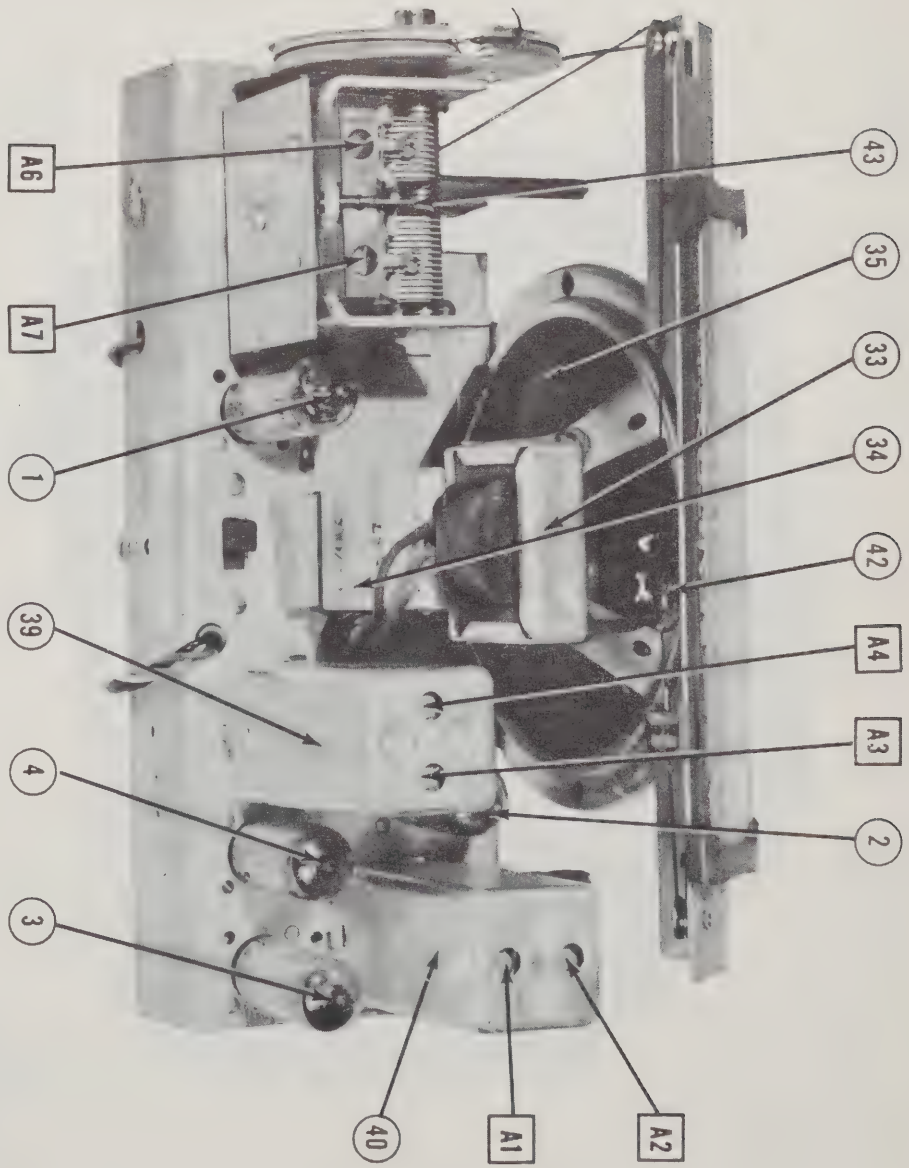
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SPARTON PART No.	IRC PART No.	IDENTIFICATION CODES
21	100KΩ	½	C8000-A12S104	BTS-100K	Br.-Blk.-Yl. Osc. Grid
22	6800Ω	½	C8000-A12S682	BTS-6800	Blue-Gray-Red Screen Decoupling
23	560Ω	½	C8000-A12S561	BTS-560	Grn.-Blue-Br. Filament String
24	47KΩ	½	C8000-A12N473	BTS-47K	Yl.-Vi.-Or. Diode Filter
25	4.7 Meg.	½	C8000-A12N475	BTS-4.7 Meg.	Yl.-Vi.-Grn. AVC Network
26	10 Meg.	½	C8000-A12N106	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
27	4.7 Meg.	½	C8000-A12N475	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Screen
28	1 Meg.	½	C8000-A12S105	BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
29	3.3 Meg.	½	C8000-A12N335	BTS-3.3 Meg.	Or.-Or.-Grn. Output Grid
30	1000Ω	½	C8000-A12S102	BTS-1000	Br.-Blk.-Red Fil. String
31	220KΩ	½	C8000-A12N224	BTS-220K	Red-Red-Yl. Series Neon Light
32	33Ω	½	C8000-A12S330	BW-½-33	Or.-Or.-Blk. Series Filament

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: SPARTON PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	INSTALLATION NOTES
33	10300Ω	3.4Ω	330Ω	.6Ω	Part of C7003	A-3879†	T22S47†	A-2932†	†Bend mounting tabs down, file out slots and mount on original brackets.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: SPARTON PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC INP.		ST-105		
34	PM	3.4Ω	C-7003	Mod. P5-X	5A15	
	CONE DIA.	VC DIA.				
35	4-3/4"	9/16"				

R F COILS

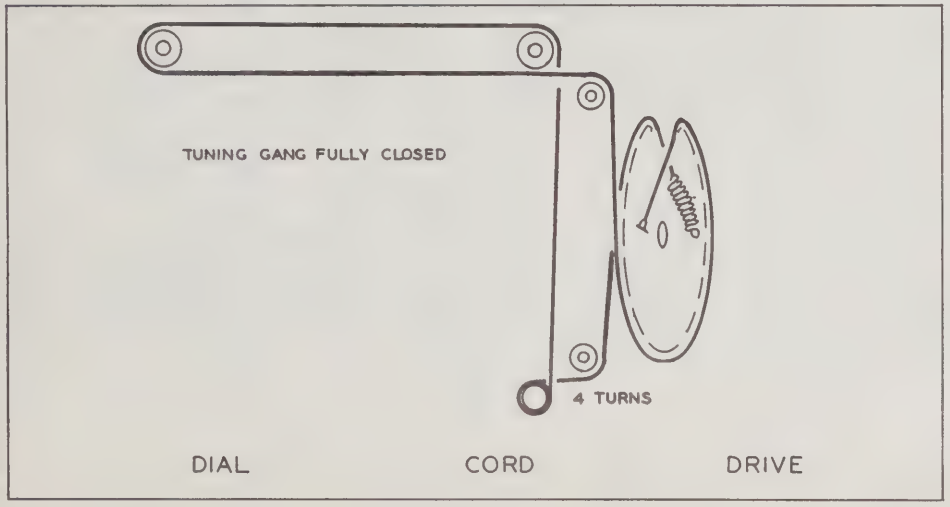
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: SPARTON PART No.	MEISSNER PART No.	
36	Wave Trap Coil		27Ω	A5005-1		
37	Ant. Coil	45Ω	3Ω	A5006	14-1056	
38	Osc. Coil	1.4Ω	6.5Ω	A5024	14-1060*	*Add 50MMFD condenser from high side of tuning cap. to osc. grid on all models not using Item 19.
39	Input IF	10.5Ω	10.5Ω	B5008-1	16-6658	
40	Output IF	11Ω	11Ω	B5008-2	16-6660	

BATTERIES

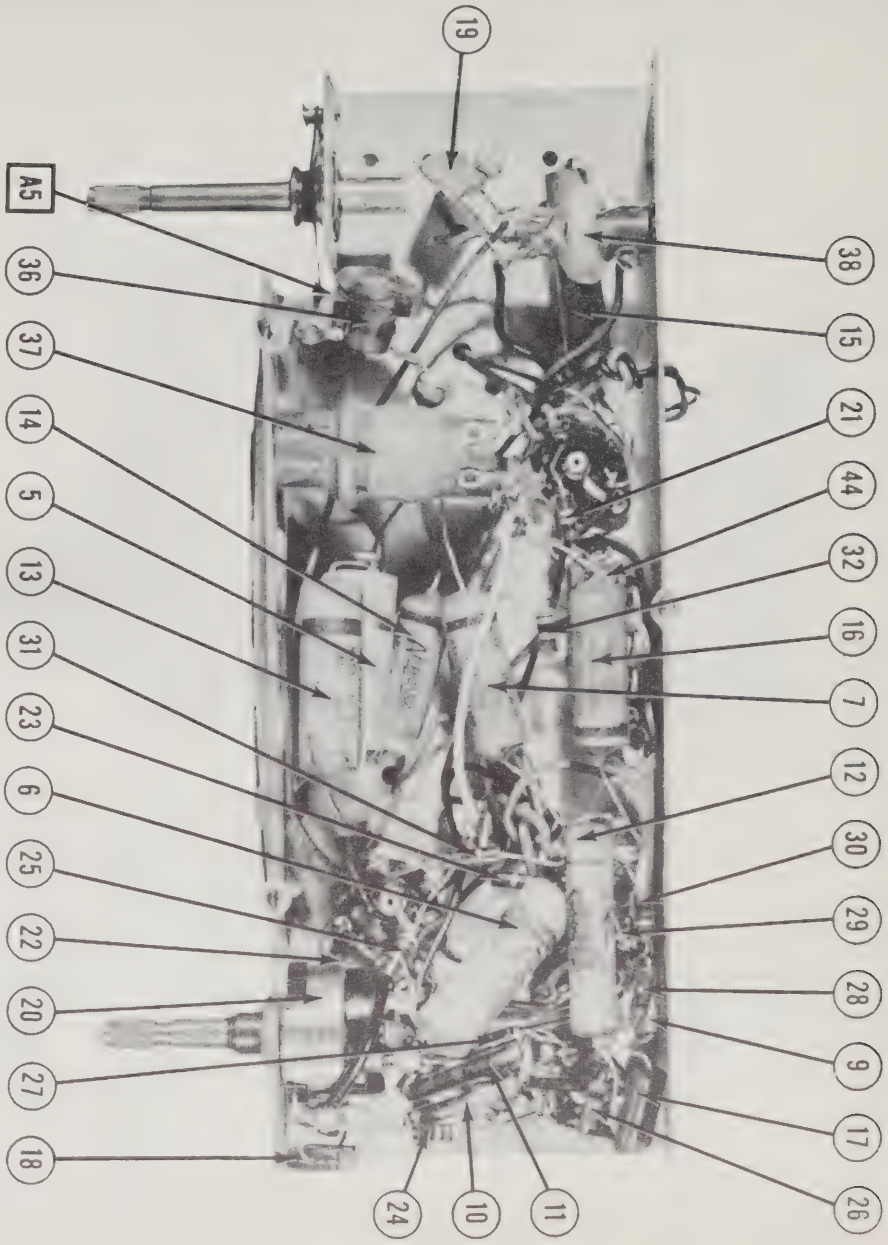
ITEM No.	VOLTAGE	SPARTON PART No.	REPLACEMENT DATA: EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
41	9V "A" 90V "B"	DB70P4			754			F6A60	

MISCELLANEOUS

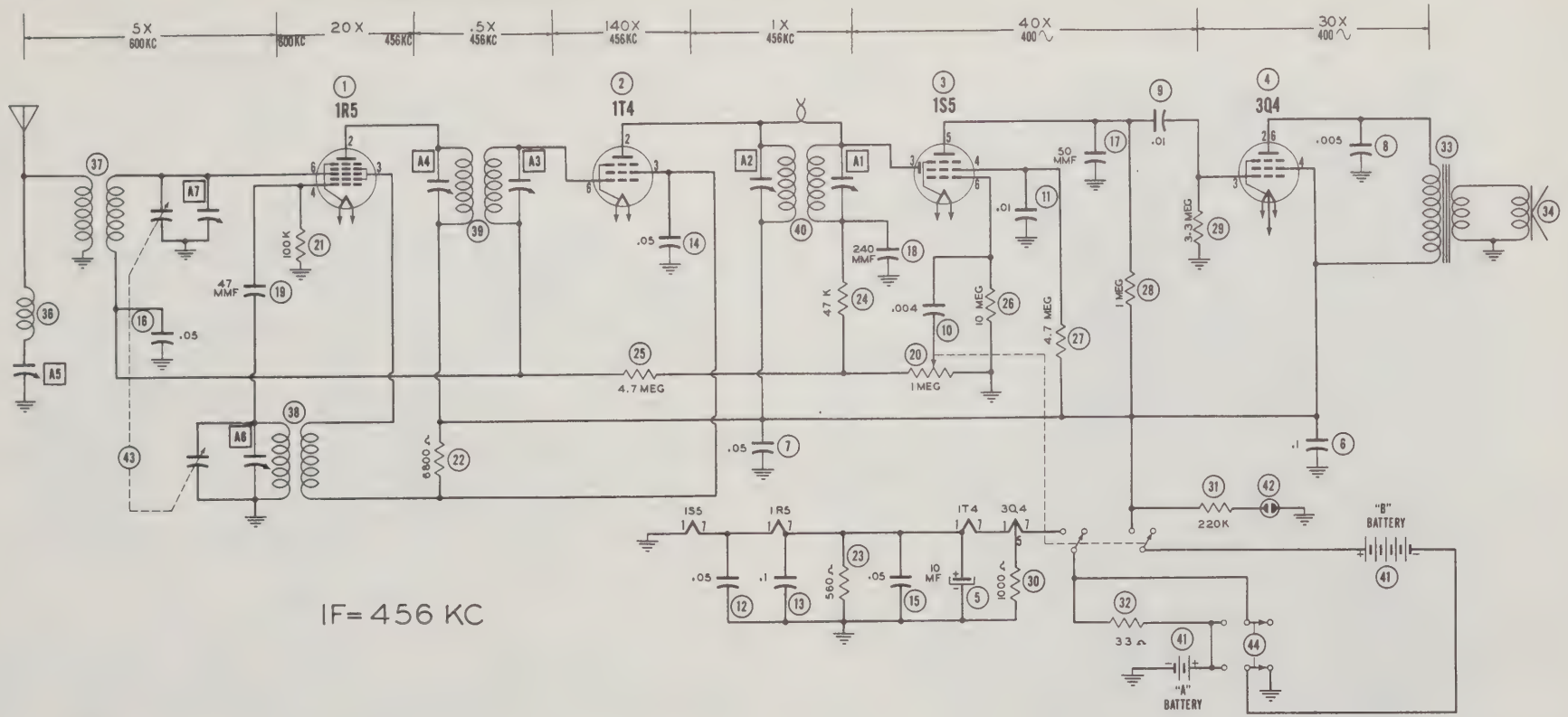
ITEM No.	PART NAME	SPARTON PART No.	NOTES
42	Lamp	A19002	Neon
43	2 Gang Var. Cap.	B11000-1	(34-440MMF, 36-193MMF)
44	Switch	A12003-2	Economizer
A5	Trimmer	A10000-4	IF Reject



CHASSIS—BOTTOM VIEW



SPARTON MODEL 4AW12



VOLTAGE AND RESISTANCE READINGS TAKEN WITH BATTERY SWITCH IN NEW POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	1.5VDC	87VDC	65VDC	-3.6VDC§	1.5VDC	0V.	2.9VDC
2	1T4	2.9VDC	87VDC	65VDC	52VDC	2.9VDC	0V.	4.6VDC
3	1S5	0V.	-.1VDC	-.1VDC	3.6VDC	25VDC	0V.	1.5VDC
4	3Q4	4.6VDC	84VDC	0V.	87VDC	6VDC	84VDC	7.5VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	*	INF.	INF.	100KΩ	*	5.7 Meg.	*
2	1T4	*	INF.	INF.	INF.	*	5.7 Meg.	*
3	1S5	0Ω	900KΩ	1 Meg.	INF.	INF.	10 Meg.	*
4	3Q4	*	INF.	3.3 Meg.	*	INF.	INF.	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

NOTE-INFINITE READING FROM B+ TO GROUND

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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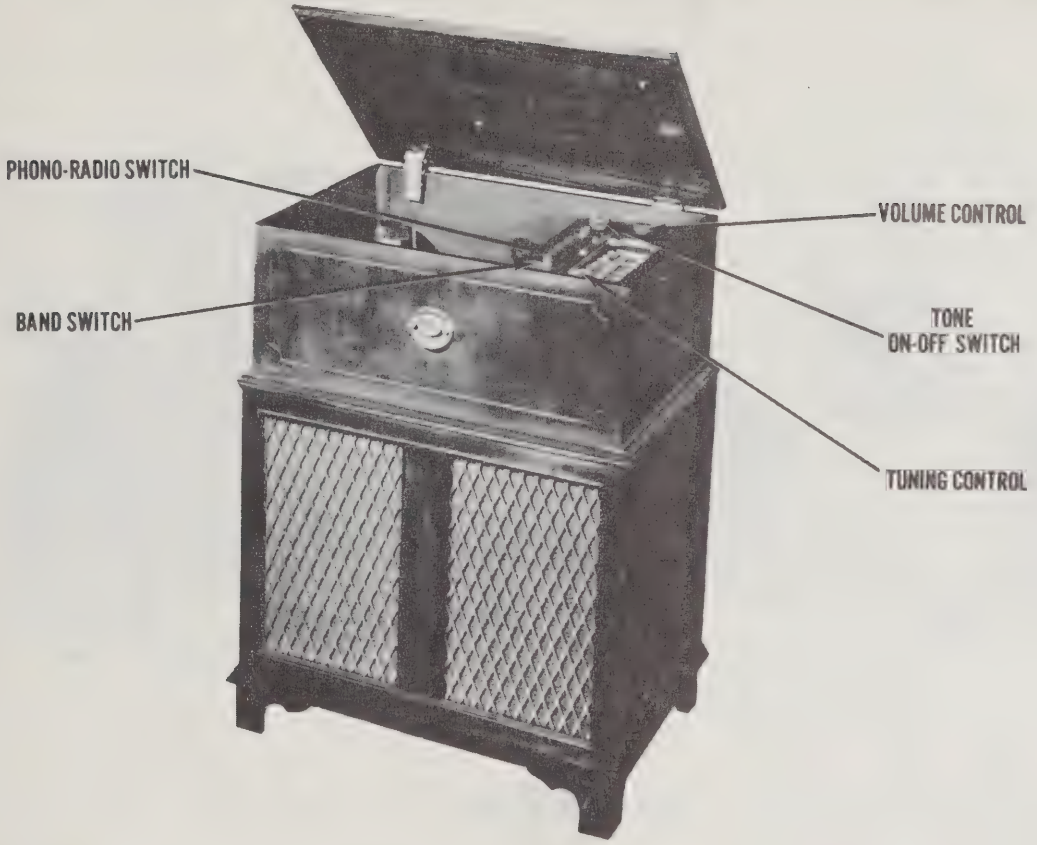
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to chassis.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5 - Volume control at maximum, no signal applied for voltage measurements.



STROMBERG-CARLSON
1220 SERIES

STROMBERG-CARLSON MODEL 1220-PL

TRADE NAME	Stromberg-Carlson, Model 1220 Series
MANUFACTURER	Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N.Y.
TYPE SET	AC Operated Combination Phono-Radio, Superheterodyne Receiver with Loop Antenna
TUBES (SEVEN)	Types, 6SK7 RF Amp., 6SA7 Converter, 6SF7 IF-Det.-AVC, 6SC7 AF-Phase Inv., (2) 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts AC — RATING .80 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC — **SHORT WAVE** 8.8-12.0MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 8 (grid) of 6SA7. Low side to chassis.	455KC	BC (Center position)	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output
2		Loop	9MC	SW (fully clock-wise)	9MC	"	A5,A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust A5 & A6 for maximum output.
3		"	12MC	"	12MC	"	A7	Adjust for maximum output.
4		"	"	"	Tune for maximum output.	"	A8	Rock tuning cap. and adjust for maximum output. Repeat Steps 2, 3 & 4 until no further improvement can be made.
5		"	600KC	BC (Center position)	600KC	"	A9,A10	Adjust for maximum output.
6		"	1400KC	"	1400KC	"	A11	" " " "
7		"	"	"	Tune for maximum output.	"	A12	Adjust for maximum output. Repeat Steps 5, 6 & 7 until no further improvement can be made.
8		"	455KC	"	1000KC	"	A13	Adjust for minimum output.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: STROMBERG-CARLSON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6SK7	6SK7	8N	
2	Converter	6SA7	6SA7	8R	
3	IF-Det.-AVC	6SF7	6SF7	7AZ	
4	AF-Inverter	6SC7	6SC7	8S	
5	Power Output	6V6GT	6V6GT	7AC	
6	" "	6V6GT	6V6GT	7AC	
7	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

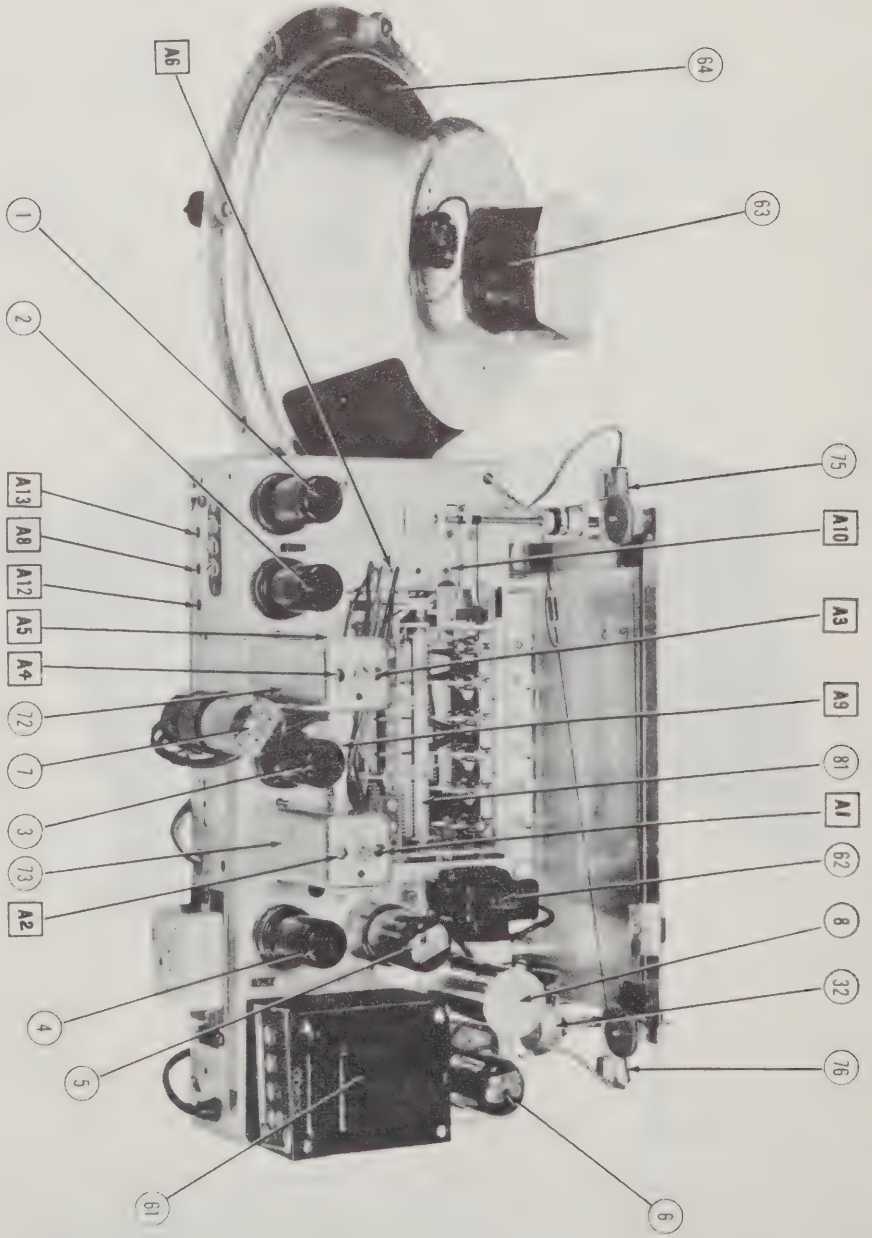
ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: STROMBERG-CARL. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	40	475	33894	AF4444J*	UP0DJ50*	DY-4x20-450*	EL420*	◓ Filter
B	15	350		PRS25/25	BR2045	M-25-25	TA-25	■ "
C	15	150						▲ Screen Bypass
D	50	25						Cathode Bypass
9	.002	600	25481	684-002	DT6D2	ST-6-002	TC-22	Output Plate Bypass
10	.01	600	25485	684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
11	.01	600	25485	684-01	DT6S1	ST-6-01	TC-11	" "
12	.01	600	25486	684-01	DT6S1	ST-6-01	TC-11	" "
13	.005	600	27760	684-005	DT6D5	ST-6-005	TC-25	" "
14	.03	400	27782	684-03	DT4S3	ST-6-03	TC-13	Tone Compensation
15	.005	600	27760	684-005	DT6D5	ST-6-005	TC-25	" "
16	.05	600	29891	684-05	DT6S5	ST-6-05	TC-15	Det.-Screen Bypass
17	.04	200		484-05	DT4S4	ST-6-04	TC-14	AVC Filter
18	.05	600	29891	684-05	DT6S5	ST-6-05	TC-15	Conv. PlateDDecoup.
19	.02	400	25150	484-02	DT4S2	ST-4-02	TC-12	RF Plate Decoupling
20	100	500	24559	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass
21	100	500	24559	1468-0001	5W5T1	MO.5-31	1FM-31	" " "
22	250	500	‡	1468-00025	5W5T25	MO.5-325	1FM-325	Tone Compensation
23	100	500	24559	1468-0001	5W5T1	MO.5-31	1FM-31	" "
24	50	500	27305	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.
25	410	500	33904					Fixed Padder
26	147	500	33907					" "
27	25	300	32056	1468-000025	5W5Q25	MO.5-425	1FM-425	Fixed Trimmer-Cer.
28	5	500		1468-000005	5W5V5	MO.5-55	MS-55	" "
29	100	500	24559	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling
30	110	500		1468-0001	5W5T1	MO.5-31	1FM-31	" "
31	200	500	33909	1469-0002	5R5T2	MOS.5-32	MS-32	Fixed Padder

*Parallel sections to obtain desired capacity.
‡Items #22, 59, 60 (Manufacturers Part #33823) are combined into one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: STROMBERG-CARLSON PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
32A	1 Meg.	½	29560	D13-137X	T-109	Volume Control tapped @ 250KΩ
B	Shaft		Not Req.	A	Not Req.	Attach to 32A per instructions

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA STROMBERG-CARLSON PART No.	IRC PART No.	IDENTIFICATION CODES
	RESISTANCE	WATTS			
33	1000Ω	½	26333	BTS-1000	Br.-Blk.-Red Antenna Loading
34	2.2 Meg.	½	26373	BTS-2.2 Meg.	Red-Red-Grn. RF Grid
35	680Ω	½	26331	BTS-680	Blue-Gray-Br. RF Cathode
36	22KΩ	½	26349	BTS-22K	Red-Red-Or. RF Plate Choke Shunt
37	10KΩ	1	30417	BTA-10K	Br.-Blk.-Or. RF Plate
38	10KΩ	1	30417	BTA-10K	Br.-Blk.-Or. " "
39	470Ω	½	26329	BTS-470	Yl.-Vi.-Br. RF Plate Decoup.
40	47KΩ	½	26353	BTS-47K	Yl.-Vi.-Or. Conv. Grid
41	1000Ω	½	26333	BTS-1000	Br.-Blk.-Red Conv. Plate Decoupling
42	62KΩ	2	149003	BT-2-68K	Blue-Red-Or. Screen Dropping
43	62KΩ	2	149003	BT-2-68K	Blue-Red-Or. " "
44	33KΩ	½	26351	BTS-33K	Or.-Or.-Or. Osc. Grid
45	47KΩ	½	26353	BTS-47K	Yl.-Vi.-Or. IF Screen
46	2.2 Meg.	½	26373	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
47	470KΩ	½	26365	BTS-470K	Yl.-Vi.-Yl. Tone Compensation
48	68KΩ	½	26355	BTS-68K	Blue-Gray-Or. " "
49	15KΩ	½	26347	BTS-15K	Br.-Grn.-Or. " "
50	12KΩ	½	26346	BTS-12K	Br.-Red-Or. " "
51	3.3 Meg.	½	26375	BTS-3.3 Meg.	Or.-Or.-Grn. AF Grid
52	470KΩ	½	26365	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
53	1500Ω	½	26335	BTS-1500	Br.-Grn.-Red AF Cathode
54	10KΩ	½	26345	BTS-10K	Br.-Blk.-Or. Phase Inv. Grid
55	470KΩ	½	26365	BTS-470K	Yl.-Vi.-Yl. Phase Inv. Plate Load
56	470KΩ	½	26365	BTS-470K	Yl.-Vi.-Yl. Output Grid
57	470KΩ	½	26365	BTS-470K	Yl.-Vi.-Yl. " "
58	240Ω	2	33913	BW-2-220	Red-Yl.-Br. Output Cathode
59	270KΩ	½	‡	BTS-270K	Red-Vi.-Yl. Phono Tone Compensation
60	100KΩ	½	‡	BTS-100K	Br.-Blk.-Yl. " " "

Items 22, 59 and 60 (Manufacturers #33823) are combined into one unit.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA STROMBERG-CARLSON PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
	PRI.	SEC. 1	SEC. 2	SEC. 3				
61	117V AC @ .8A	750V CT @ 110ADC	5.3V AC @ 2.0A	6.5V AC @ 2.5A	33900	P-6013†	T22R04†	P-2952†

†Drill new mounting holes.

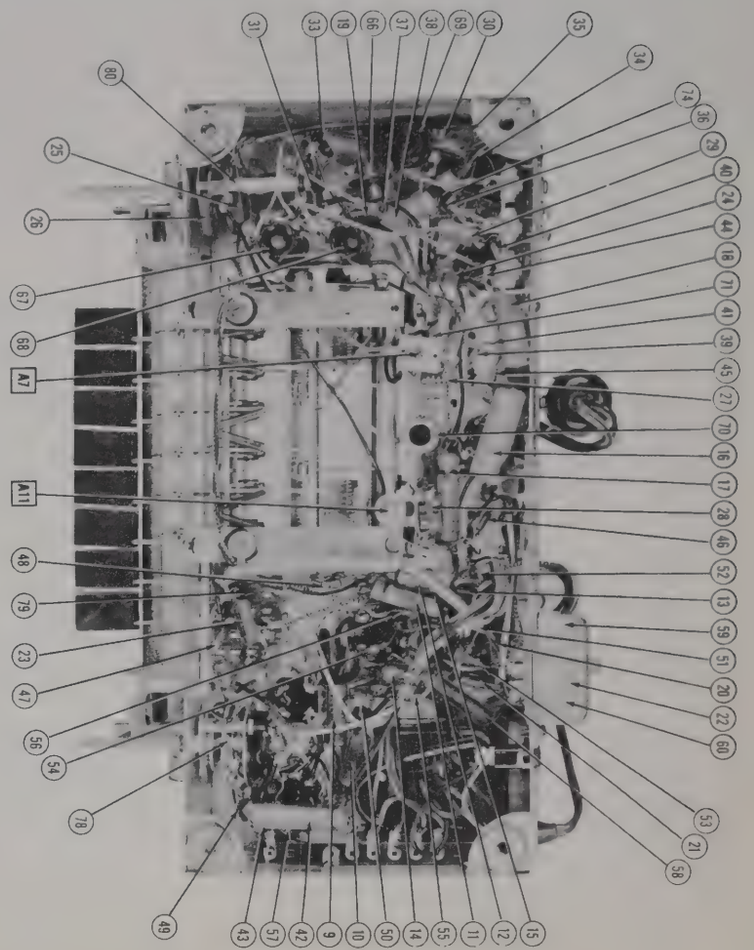
TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA STROMBERG-CARLSON PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
	IMPEDANCE PRI.	IMPEDANCE SEC.	DC RES. PRI.	DC RES. SEC.					
62	8200Ω CT	3.6Ω	405Ω CT	.8Ω	33853	A-3850		A-2903	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA STROMBERG-CARLSON PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-744		
63	950Ω	3.6Ω	33435	Mod. F12-S	12E10#	#Replace output transformer to match 6-Ω voice coil.
	CONE DIA.	VC DIA.				
64	11"	1"	33438			

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA STROMBERG-CARLSON PART No.	MEISSNER PART No.
65	Loop Ant.		0Ω	37114	
66	Loop Load. Coil		7.8Ω	33910	
67	Ant.Coil BC		4.2Ω	33876	
68	" " SW		.1Ω	33878	
69	Wave Trap Coil		59Ω	33908	
70	Osc. CoilBC		4.6Ω	33877	
71	" " SW		0Ω	33879	
72	Input IF	11.6Ω	8.5Ω	33886	16-5712
73	Output IF	12Ω		33882	16-6670
74	RF Plate Choke		4.5Ω	33886	

DIAL LIGHT

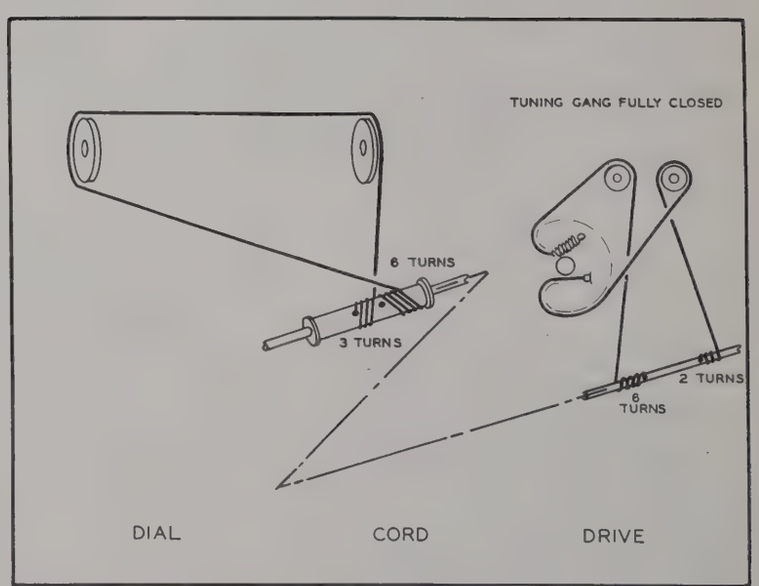
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA STROMBERG-CARLSON PART No.		INSTALLATION NOTES
75	Bayonet	6-8	0.25	Blue			Type #44
76	"	"	"	"			" "

PHONO CARTRIDGE

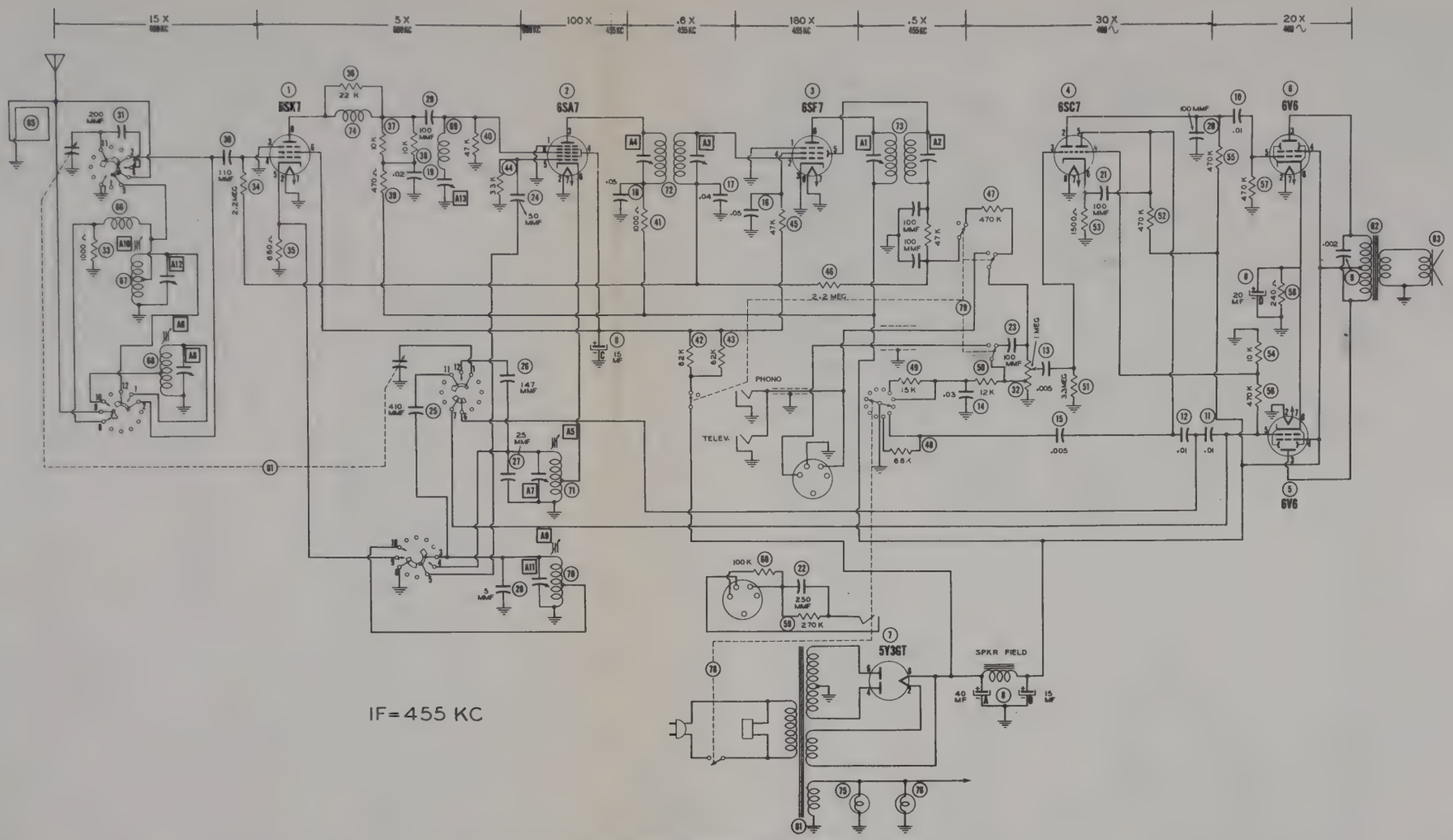
ITEM No.	REPLACEMENT DATA STROMBERG. PART No.	ASTATIC PART No.	REMARKS
77		L-72A	L-72 Original Part

MISCELLANEOUS

ITEM No.	PART NAME	STROMBERG-CARLSON PART No.	NOTES
78	Switch	32663	On-Off/Tone
79	"	32064	Radio-Phono
80	"	33893	Band
81	2 Gang Var. Cap.	33755	(12-446MMF, 17-352MMF)
A7	Trimmer	27081	SW Osc. Adj.
A8	"	33885	SW Ant. Adj.
A11	"	33567	BC Osc. Adj.
A12	"	33885	BC Ant. Adj.
A13	"	33885	Wave Trap Adj.



DATE 11/48-#4820-19 SET #50-FOLDER #19



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.
RADIO-PHONO SWITCH IN RADIO POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0V.	6.5VAC	0V.	-.6VDC	4.8VDC	90VDC	0V.	200VDC
2	6SA7	0V.	0V.	255VDC	90VDC	-9.5VDC	0V.	6.5VAC	0V.
3	6SF7	0V.	-.2VDC	0V.	100VDC	-.2VDC	255VDC	0V.	6.5VAC
4	6SC7	0V.	75VDC	0v.	0V.	75VDC	1.2VDC	0V.	6.5VAC
5	6V6GT	0V.	6.5VAC	250VDC	255VDC	0V.	0V.	0V.	17VDC
6	6V6GT	0V.	0V.	250VDC	255VDC	0V.	0V.	6.5VAC	17VDC
7	5Y3GT	0V.	360VDC	0V.	375VAC	0V.	375VAC	0V.	360VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0Ω	.1Ω	0Ω	5.4 Meg.	680Ω	80KΩ	0Ω	55KΩ
2	6SA7	0Ω	0Ω	50KΩ	80KΩ	33KΩ	0w	.1Ω	47KΩ
3	6SF7	0Ω	3.7 Meg.	0Ω	100KΩ	1.5 Meg.	50KΩ	0Ω	.1Ω
4	6SC7	0Ω	520KΩ	3.3 Meg.	10KΩ	520KΩ	1.5KΩ	0Ω	.1Ω
5	6V6GT	0Ω	.1Ω	50KΩ	50KΩ	480KΩ	0Ω	0Ω	240Ω
6	6V6GT	0Ω	0Ω	50KΩ	50KΩ	470KΩ	10KΩ	.1Ω	240Ω
7	5Y3GT	INF.	50KΩ	INF.	100Ω	INF.	95Ω	INF.	50KΩ

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY
ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS
THE COOPERATION OF THE MANUFACTURER OF THIS
RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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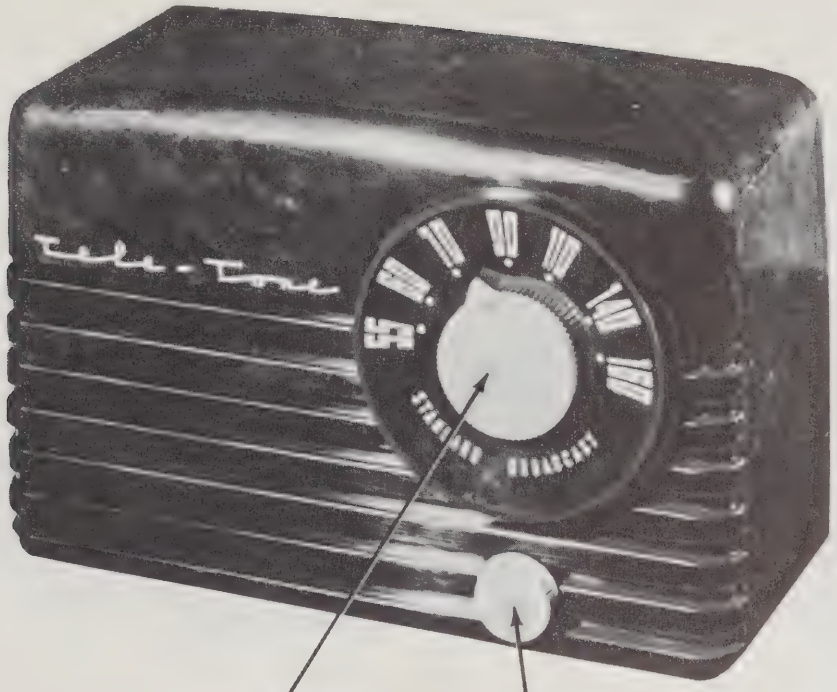
TELE-TONE MODEL 165
(Ch. Series AG)



TELE-TONE MODEL 165
(Ch. Series AG)

TELE-TONE MODEL 165

TRADE NAME	Tele-Tone, Model 165 (Ch. Series AG)
MANUFACTURER	Tele-Tone Radio Co., 540 W. 58th St., New York 19, N.Y.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 12BE6 Converter, 12AT6 Det.-AVC-AF, 50B5 Power Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	532.5-1620KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect connect a .1 MFD capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 7 (grid) of 12BE6. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	.1 MFD.	"	1620KC	"	"	A3	Adjust for maximum output.
3	75 MMFD	High side to ext. ant. lead. Low side side to B-.	1400KC	Tune for maximum output.	"	A4	" " " "

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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DATE 11/48-#4820-20 SET #50-FOLDER #20

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		TELE-TONE PART No.	STANDARD REPLACEMENT		
1	Converter	12BE6	12BE6	7CH	
2	Det.-AVC-AF	12AT6	12AT6	7BT	
3	Power Output	50B5	50B5	7BZ	
4	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	TELE-TONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
5A	40	150	CE-15	PRSA150/40-40	EDL4415	DSB2x40-150	TA-440	Filter-Red
B	40	150						" -Green
6	.02	400	CP203-1	484-02	DT4S2	ST-4-02	TC-12	Rectifier Bypass
7	.05	200	CP503-4	484-05	DT2S5	ST-4-05	72P1	Line Isolation
8	.02	600	CP203-1	684-02	DT6S2	ST-6-02	TC-12	Output Plate Bypass
9	.006	400		484-006	DT6D6	ST-6-006	TC-26	Audio Coupling
10	.0015	400		1467-0015	1W5D15	MW.5-215	1FM-215	" "
11	.05	200	CP503-4	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
12	150	300	CM151-1	1468-00015	5W5T15	M0.5-315	1FM-315	Diode RF Filter-Cer.

CONTROLS

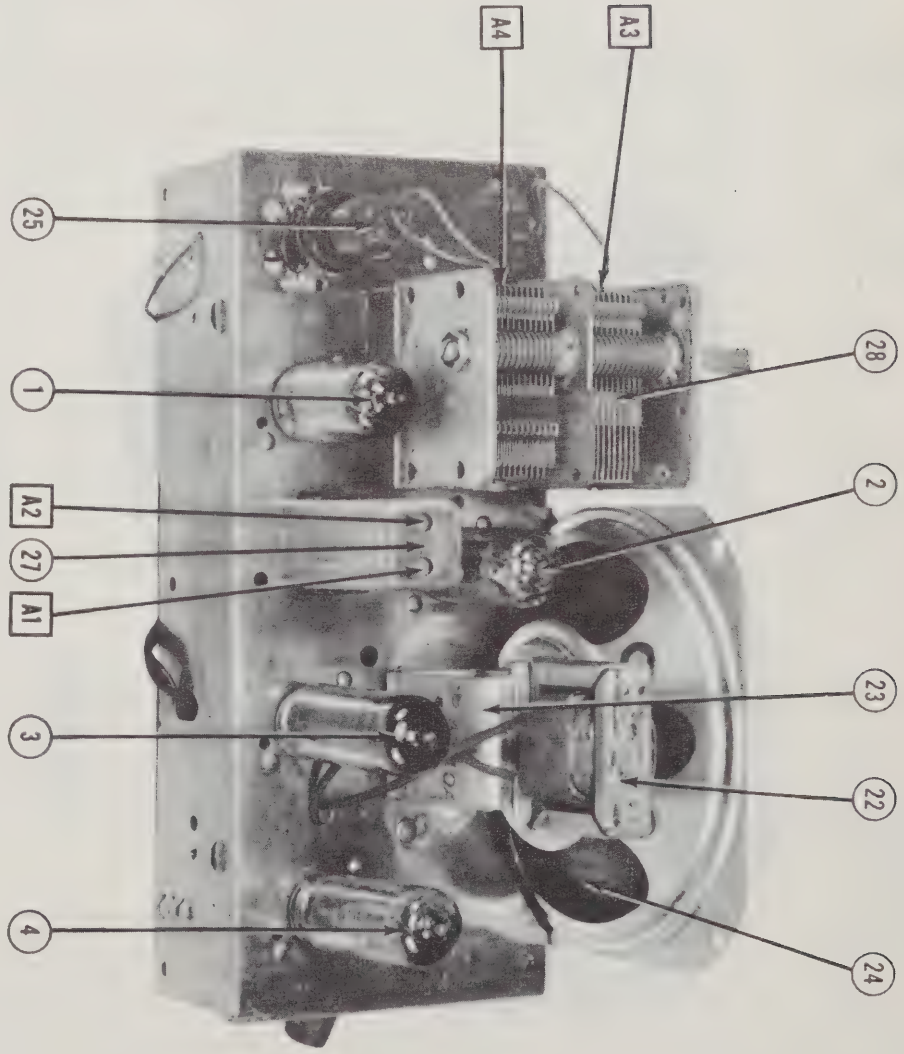
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	TELE-TONE PART No.	IRC PART No.	CLAROSTAT PART No.	
13A	2 Meg.	½	VC-11	D13-139*	M-66-Z*	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 13A per instructions
C	Switch		" "	41	SW-A	" " " " "

*Install a 100KΩ fixed resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Controls viewed from shaft side, terminals down.)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	TELE-TONE PART No.	IRC PART No.	
14	18KΩ	½	RC183-2	BTS-18K	Br.-Gray-Or. Osc. Grid
15	4.7 Meg.	½	RC475-1	BTS-4.7 Meg.	Yl.-Vi.-Grn. AVC Network
16	10 Meg.	½	RC106-1	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
17	220KΩ	½	RC224-1	BTS-220K	Red-Red-Yl. AF Plate
18	330KΩ	½		BTS-330K	Or.-Grn.-Yl. Output Grid
19	2200Ω	1	RC222-4	BTA-2200	Red-Red-Red Filter
20	18Ω	½	RC180-1	BW-½-18	Br.-Gray-Blk. Rectifier Ballast
21	39Ω	1	RC390-4	BW-1-39	Or.-White-Blk. Line Dropping

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		TELE-TONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
22	2700Ω	3.3Ω	275Ω	.8Ω	TR-10	A-3876†	T22S45†	A-2928†	†Bend mounting tabs down, file out slots and mount on original bracket.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TELE-TONE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-113		
23	PM	3.3Ω	SP-47-10A	Mod. P4-X	4A15	
	CONE DIA.	VC DIA.				
24	4"	9/16"				

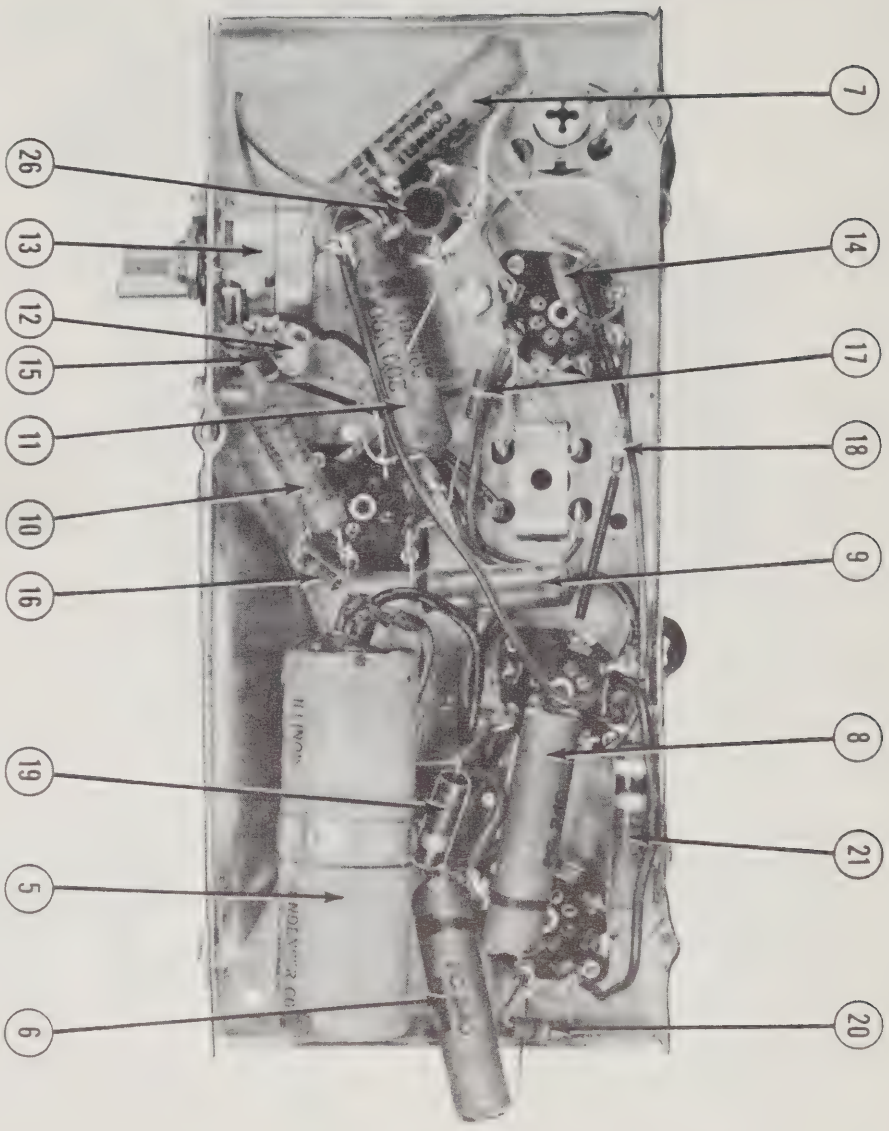
R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	TELE-TONE PART No.	MEISSNER PART No.	
25	Ant. Coil	42Ω	2.2Ω	LA-5	14-1056	
26	Osc. Coil	.5Ω	6Ω	LC-6	14-1060‡	‡Add 50MMF from high side tuning cap. to osc. grid.
27	IF Trans.	18.5Ω	18.5Ω	LF-24		

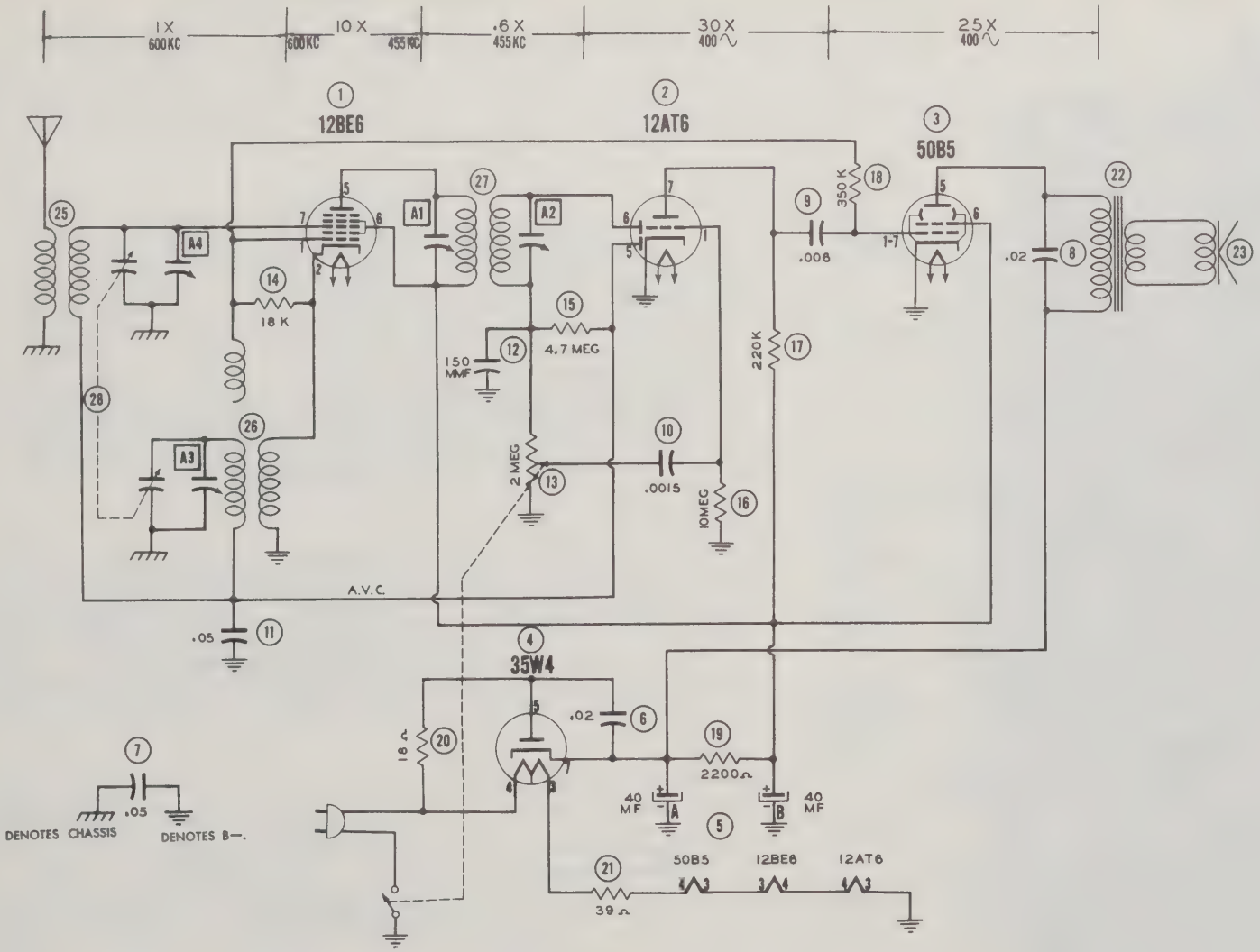
MISCELLANEOUS

ITEM No.	PART NAME	TELE-TONE PART No.	NOTES
28	2 Gang Var. Cap.	CV-14	(27-446 MMF, 24-185MMF)

CHASSIS—BOTTOM VIEW



TELE-TONE MODEL 165



Pin No.	12BE6 Volt.	12BE6 Res.	12AT6 Volt.	12AT6 Res.
1	-6VDC§	18KΩ	-6VDC§	10 Meg.
2	0V.	.5Ω	0V.	0Ω
3	25VAC	28Ω	0V.	0Ω
4	12VAC	16Ω	12VAC	16Ω
5	90VDC	190KΩ	-.6VDC	6.7 Meg.
6	90VDC	190KΩ	-.6VDC	2 Meg.
7	-.6VDC	6.7 Meg.	80VDC	410KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

Pin No.	50B5 Volt.	50B5 Res.	35W4 Volt.	35W4 Res.
1	-1.4VDC	360KΩ	0V.	INF.
2	0V.	0Ω	0V.	INF.
3	75VAC	80Ω	80VAC	119Ω
4	25VAC	28Ω	117VAC	150Ω
5	105VDC	190KΩ	114VAC	170Ω
6	90VDC	190KΩ	108VAC	140Ω
7	-1.4VDC	360KΩ	120VDC	190KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

IF=455 KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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4820-20

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

TRUETONE MODEL D4842
(Fact. #26C21-81)

TRUETONE MODEL D4842
(Fact. #26C21-81)

TRUETONE MODEL D4842

TRADE NAME	Truetone, Model D4842 (Fact. #26C21-81)
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	Battery Operated Universal Type Automotive Receiver
TUBES (SIX)	Types, 6BA6 RF Amp., 6BE6 Converter, 6BA6 IF Amp., 6AV6 Det.-AVC-1st AF, 6AR5 2nd AF, 6N7 Power Output.
POWER SUPPLY	6 Volt Storage Battery
TUNING RANGE—BROADCAST	540-1600KC RATING 6.1 Amp. @ 6.3 Volts DC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	455KC	Tuning control fully counter-clockwise	Across voice coil	A1,A2, A3,A4	Adjust for maximum output.
2	60 MMFD	High side to ant. socket. Low side to chassis.	1600KC	"	"	A5	Adjust for maximum output.
3	60 MMFD	"	1400KC	Tune for maximum output.	"	A6,A7	Adjust for maximum output. Loosen knurled nut at tuning control clamp fitting and turn flexible shaft until dial pointer sits at 1400KC calibration mark. Slide flexible shaft in or out of tuning control clamp fitting until a smooth action with minimum backlash is obtained. Tighten knurled nut.

Install receiver in car with antenna fully extended. Tune in weak station near 1400KC and adjust A7 for maximum volume.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		TRUETONE PART No.	STANDARD REPLACEMENT		
1	RF Amp.	6BA6	6BA6	7BK	
2	Converter	6BE6	6BE6	7CH	
3	IF Amp.	6BA6	6BA6	7BK	
4	Det.-AVC-1st AF	6AV6	6AV6		
5	2nd AF	6AR5	6AR5		
6	Power Output	6N7	6N7	8B	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	TRUETONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
7A	20	400	45X366		UP2245C	DY-312	EL322	■ Filter
B	20	400						▲ "
C	20	25						Cathode Bypass
8	.5	100	46X395		DT2P5	SHH-1		Hash Filter
9	.5	100	46X395		DT2P5	SHH-1		" "
10	.5	100	46X395	484-.5	DT2P5	SHH-1		" "
11	.008	1600	P54802	1684-0075	MD16D8	STM-16-008	TR-28	Buffer
12	.002	1000	46X405	1084-002	MD16D2	STM-16-002	TR-22	Output Plate Bypass
13	.001	1000	46X406	1084-001	MD16D1	STM-16-001	TR-21	AF Plate Bypass
14	.01	400	46X401	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
15	.005	200	46X400	484-005	DT6D5	ST-6-005	TC-25	" "
16	.002	600	46X407	684-002	DT6D2	ST-6-002	TC-22	Tone Compensation
17	.047	400	46X397	484-05	DT4S5	ST-4-05	TC-15	AF Plate Decoupling
18	.047	200	46X398	484-05	DT2S5	ST-4-05	TC-15	Tone Compensation
19	.047	400	46X397	484-05	DT4S5	ST-4-05	TC-15	RF Bypass Pwr. Supply
20	.047	400	46X397	484-05	DT4S5	ST-4-05	TC-15	Screen Decoupling
21	.05	200	46X398	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
22	.001	400	46X399	484-001	DT6D1	ST-6-001	TC-21	RF Coupling
23	.001	400	46X399	484-001	DT6D1	ST-6-001	TC-21	Fixed Trimmer
24	.0017	400		484-002	DT6D2	ST-6-002	TC-22	Antenna Coupling
25	200	300	47X129	1468-0002	5W5T2	MO.5-32	1FM-32	RF Bypass
26	210	300	47X114	1468-0002	5W5T2	MO.5-32	1FM-32	" "
27	2000	500	47X520	1467-002	1W5D2	MW.5-22	1FM-22	" " -Cer.
28	2000	500	47X520	1467-002	1W5D2	MW.5-22	1FM-22	" " "
29	500	300	47X496	1468-0005	5W5T5	MO.5-35	1FM-35	" " "
30	150	300	47X527	1468-00015	5W5T15	MO.5-315	1FM-315	B+ AF Grid Bypass-Cer.
31	100	300	47X497	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass- "
32A	50	300	*	1468-00005	5W5Q5	MO.5-45	1FM-45	Diode RF Filter "
B	50	300		1468-00005	5W5Q5	MO.5-45	1FM-45	" " "
33	68	500	46X471	1468-000075	5W5Q7	MO.5-47	MS-47	Tone Compensation
34	47	300	47X495	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
35	47	300	47X517	1468-00005	5W5Q5	MO.5-45	1FM-45	Fixed Trimmer-Cer.
36	100	500	47X526	1468-0001	5W5T1	MO.5-31	1FM-31	" "

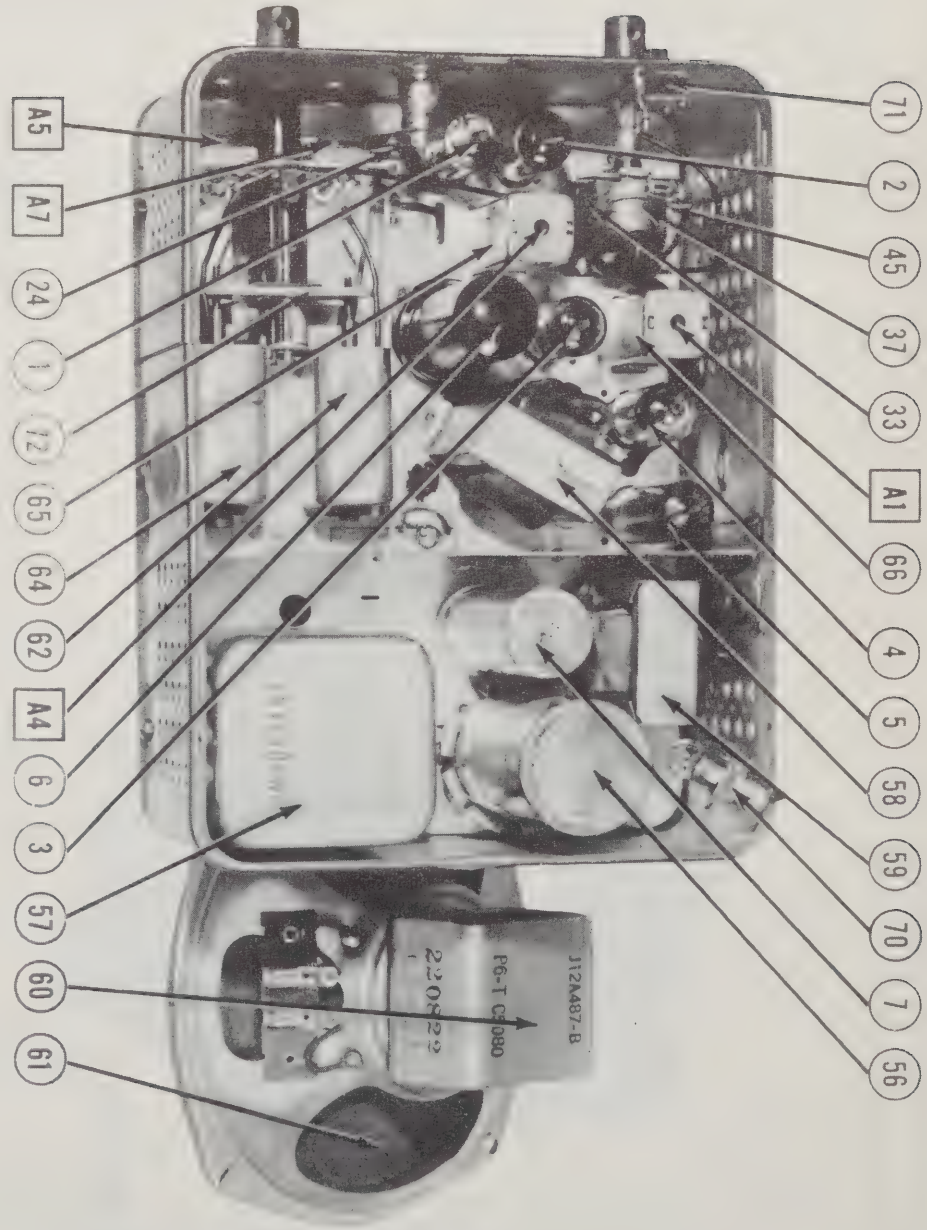
*Item #32A & B and 44 are combined into one part and are obtainable under manufacturers Part No. 76X1.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	
37A	500KΩ	½	36X377	D18-133X	AT-88	Volume Control tapped @ 50KΩ
B	Shaft		Not Req.	B	DFS-½†	Attach to 37A per instructions
C	Switch		" "	41	SW-A	" " " " "

†Use original funnel on this replacement.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	TRUETONE PART No.	IRC. PART No.	
38	470KΩ	½	B85474	BTS-470K	Yl.-Vi.-Yl. RF Grid
39	68Ω	½	B85680	BW-½-68	Blue-Gray-Blk. RF Cathode
40	10KΩ	1	C85103	BTA-10K	Br.-Blk.-Or. RF Plate Load
41	10KΩ	½	B85103	BTS-10K	Br.-Blk.-Or. Conv. Grid
42	22KΩ	½	B85223	BTS-22K	Red-Red-Or. Osc. Grid
43	2.2 Meg.	½	B85225	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
44	47KΩ	½	*	BTS-47K	Yl.-Vi.-Yl. Diode Filter
45	15KΩ	½	B85153	BTS-15K	Br.-Grn.-Or. Tone Compensation
46	15KΩ	2	D84153	BT-2-15K	Br.-Grn.-Or. Screen Dropping
47	10 Meg.	½	B85106	BTS-10 Meg.	Br.-Blk.-Blue 1st AF Grid
48	470KΩ	½	B85474	BTS-470K	Yl.-Vi.-Yl. 1st AF Plate Load
49	47KΩ	½	B85473	BTS-47K	Yl.-Vi.-Or. 1st AF Plate Decoupling
50	470KΩ	½	B85474	BTS-470K	Yl.-Vi.-Yl. 2nd AF Grid
51	1500Ω	1	C84152	BTA-1500	Br.-Grn.-Red 2nd AF Cathode
52	1800Ω	2	D84182	BT-2-1800	Br.-Gray-Red Filter
53	10KΩ	1	B85103	BTA-10K	Br.-Blk.-Or. Hash Suppressor
54	56Ω	1	C85560	BW-1-56	Grn.-Blue-Blk. " "
55	56Ω	1	C85560	BW-1-56	Grn.-Blue-Blk. " "
73	470Ω	½	B84471		Yl.-Vi.-Br. IF Cathode

*Item numbers 44, 32A and 32B are combined into one part and are obtainable under Part #76X1.

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA		INSTALLATION NOTES
				TRUETONE PART No.	RADIART PART No.	
56	Synchronous	6.3 VDC	115 ∿	19A42	5406	

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	TRUETONE PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	
57	6.3V CT @ 3.35A	590V CT @.055A			53X295	P-4061‡#	T22R20#	P-2971#	

‡Adjust buffer condenser value if necessary.
#Drill new mounting holes.

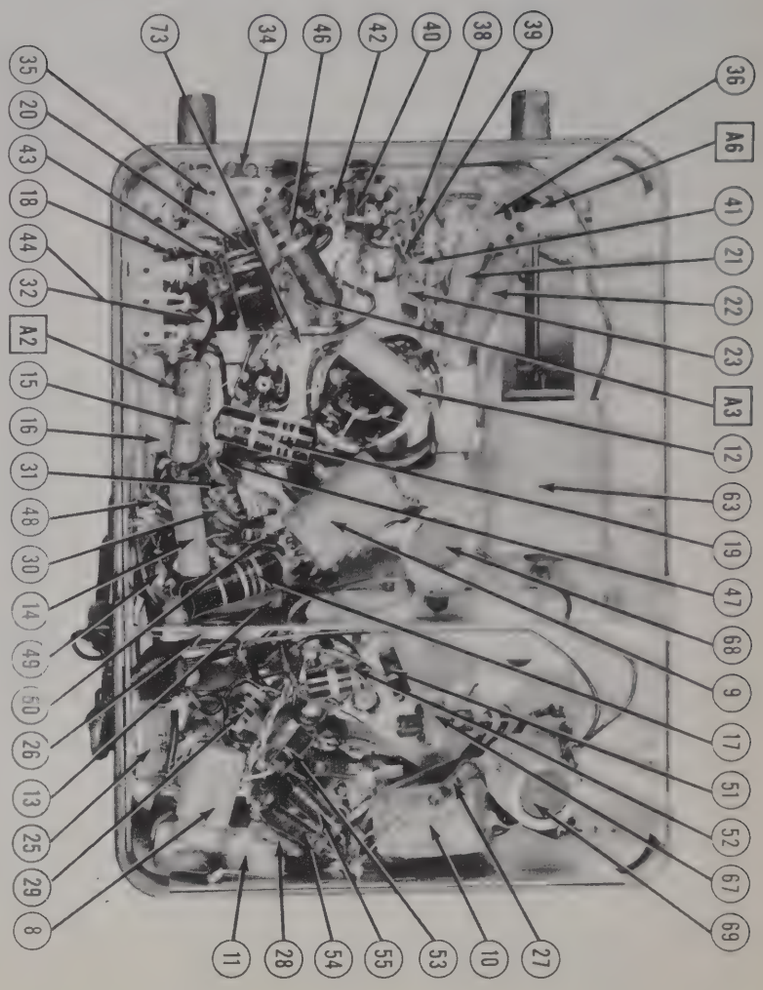
TRANSFORMER (DRIVER)

ITEM No.	RATING			REPLACEMENT DATA				INSTALLATION NOTES
	TURNS RATIO PRI. to SEC.	DC RES. PRI.	DC RES. SEC.	TRUETONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
58	5 to 1	78Ω	85Ω CT	50X47A			A-2920**	**Drill one new mounting hole.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE PRI.	IMPEDANCE SEC. 1	DC RES. PRI.	DC RES. SEC. 1	TRUETONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
59	7600Ω CT	3.4Ω	345Ω CT	.3Ω	51X138				
		SEC. 2		SEC. 2					
				12Ω					

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TRUETONE PART No.	JENSEN PART No.	QUAM PART No.	
60	FIELD PM	VC IMP. 3.4Ω	12A487	ST-112 Mod. P6-T	6A21	
61	CONE DIA. 5-7/8"	VC DIA. 9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	TRUETONE PART No.	MEISSNER PART No.	
62	Ant. Coil		9Ω			Items 62, 63, 64 are ganged together and slugged tuned. They are part of tuning assembly 20A100. Entire assembly must be ordered.
63	RF Coil		9Ω			
64	Osc. Coil	1Ω	7Ω			
65	Input IF	19Ω	19Ω	9A1963		
66	Output IF	19Ω	19Ω	9A1963		
67	RF Choke		20Ω	9A1964		
68	Fil. Choke		0Ω	9A1958		
69	Vib. Choke		0Ω	9A1958		

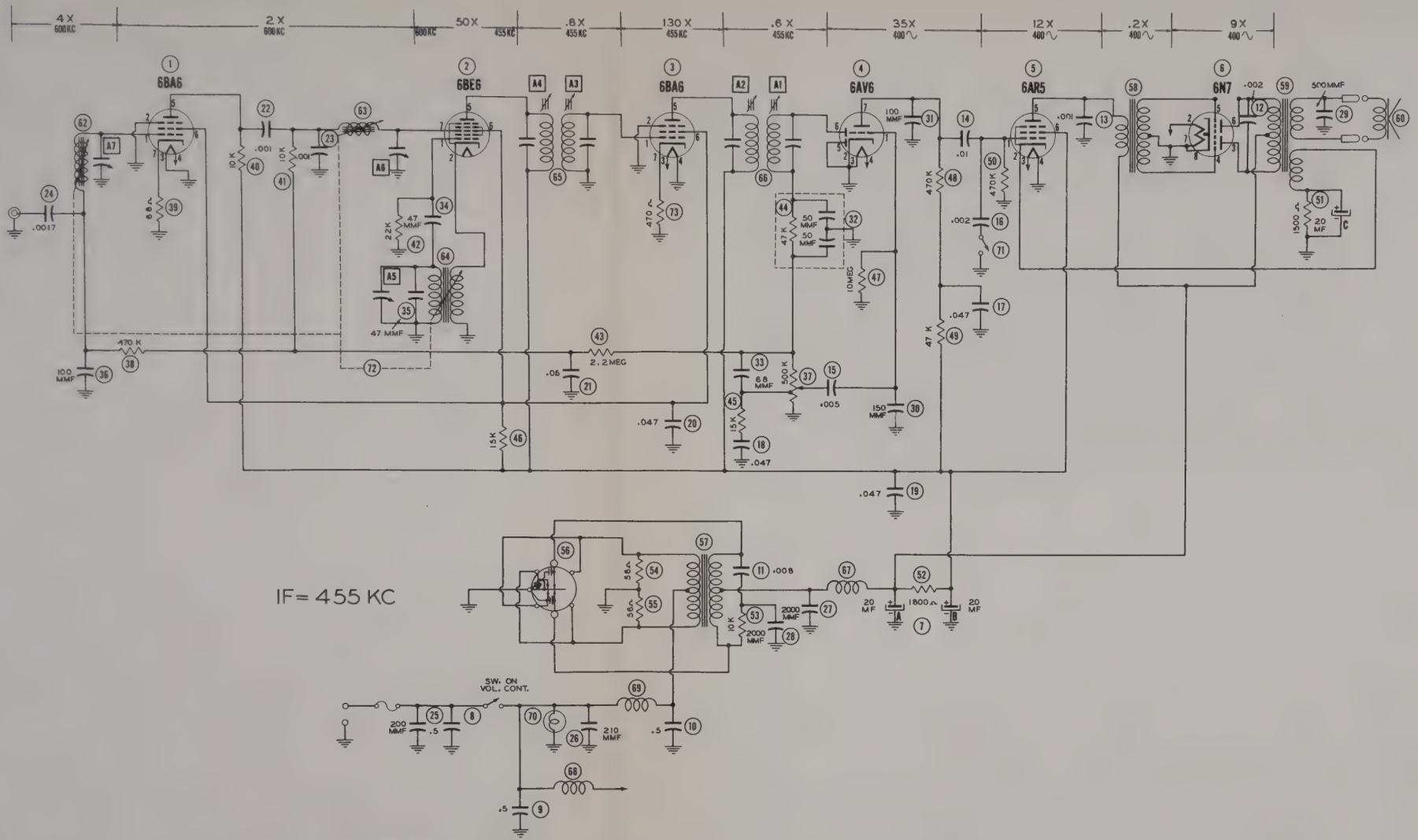
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					TRUETONE PART No.		
70	Bayonet	7.5	0.2	Blue	7A32		Type 51

MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
71	Switch	2A175	Tone
72	Tuning Assembly	20A100	
	Fuse	16X27	14 Amp.

DATE 11/49-#4820-21 SES #50-FOLDER #21



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	-.4VDC	0V.	0V.	6.1VDC	175VDC	60VDC	.4VDC	-
2	6BE6	-6VDC§	0V.	0V.	6.1VDC	200VDC	60VDC	-.2VDC	-
3	6BA6	0V.	0V.	0V.	6.1VDC	200VDC	60VDC	1.8VDC	-
4	6AV6	-.6VDC	0V.	0V.	6.1VDC	0V.	-1.2VDC	90VDC	-
5	6AR5	0V.	18VDC	0V.	6.1VDC	225VDC	200VDC	185VDC	-
6	6N7	0V.	6.1VDC	225VDC	0V.	0V.	225VDC	0V.	0V.

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	3.2 Meg.	0Ω	0Ω	.1Ω	110KΩ	120KΩ	68Ω	-
2	6BE6	22KΩ	1Ω	0Ω	.1Ω	100KΩ	120KΩ	2.7 Meg.	-
3	6BA6	19Ω	0Ω	0Ω	.1Ω	100KΩ	120KΩ	470Ω	-
4	6AV6	10 Meg.	0Ω	0Ω	.1Ω	0Ω	550KΩ	610KΩ	-
5	6AR5	470KΩ	1.5KΩ	0Ω	.1Ω	100KΩ	100KΩ	150KΩ	-
6	6N7	0Ω	.1Ω	100KΩ	42.5Ω	42.5Ω	100KΩ	0Ω	0Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 6.3 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, no signal applied for voltage measurements.

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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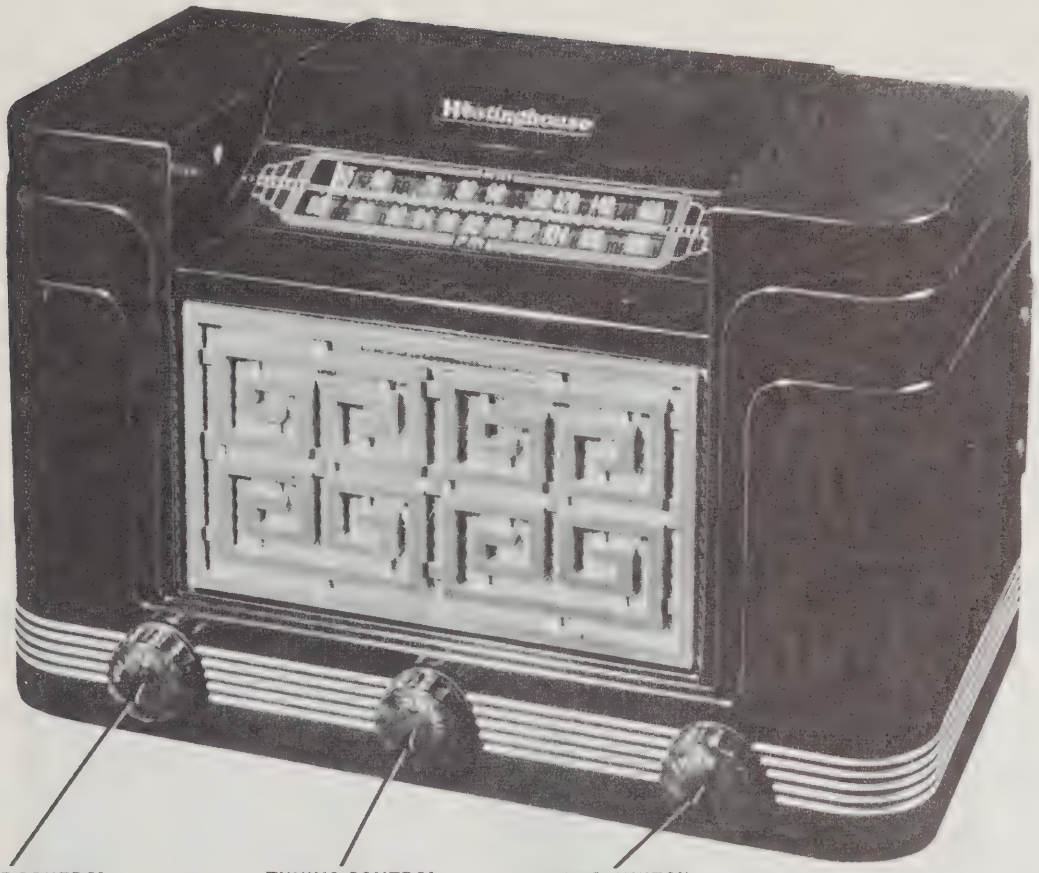
WESTINGHOUSE MODELS H-202, H-204 (Ch. V-2128-2)

WESTINGHOUSE MODELS H-202, H-204 (Ch. V-2128-2)



WESTINGHOUSE MODELS H-202, H-204 (Ch. V-2128-2)

TRADE NAME	Westinghouse, Models H-202, H-204 (Ch. V-2128-2)		
MANUFACTURER	Westinghouse Electric Corp., Receiver Div., Sunbury, Pa.		
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna		
TUBES (S1X)	Types, 12AT7 FM RF Amp.-Mixer, 12BE6 AM Conv.-FM Osc., 12BA6 1st AM-FM IF, 12BA6 2nd FM IF, 19T8 Det.-AVC-AF, 50B5 Power Output		
POWER SUPPLY	105-120 Volts AC	RATING	.30 Amp. @ 117 Volts AC
RATING-BROADCAST	540-1600KC	FREQ. MOD.	88-108MC

HOWARD W. SAMS & CO., INC. Indianapolis . Indiana

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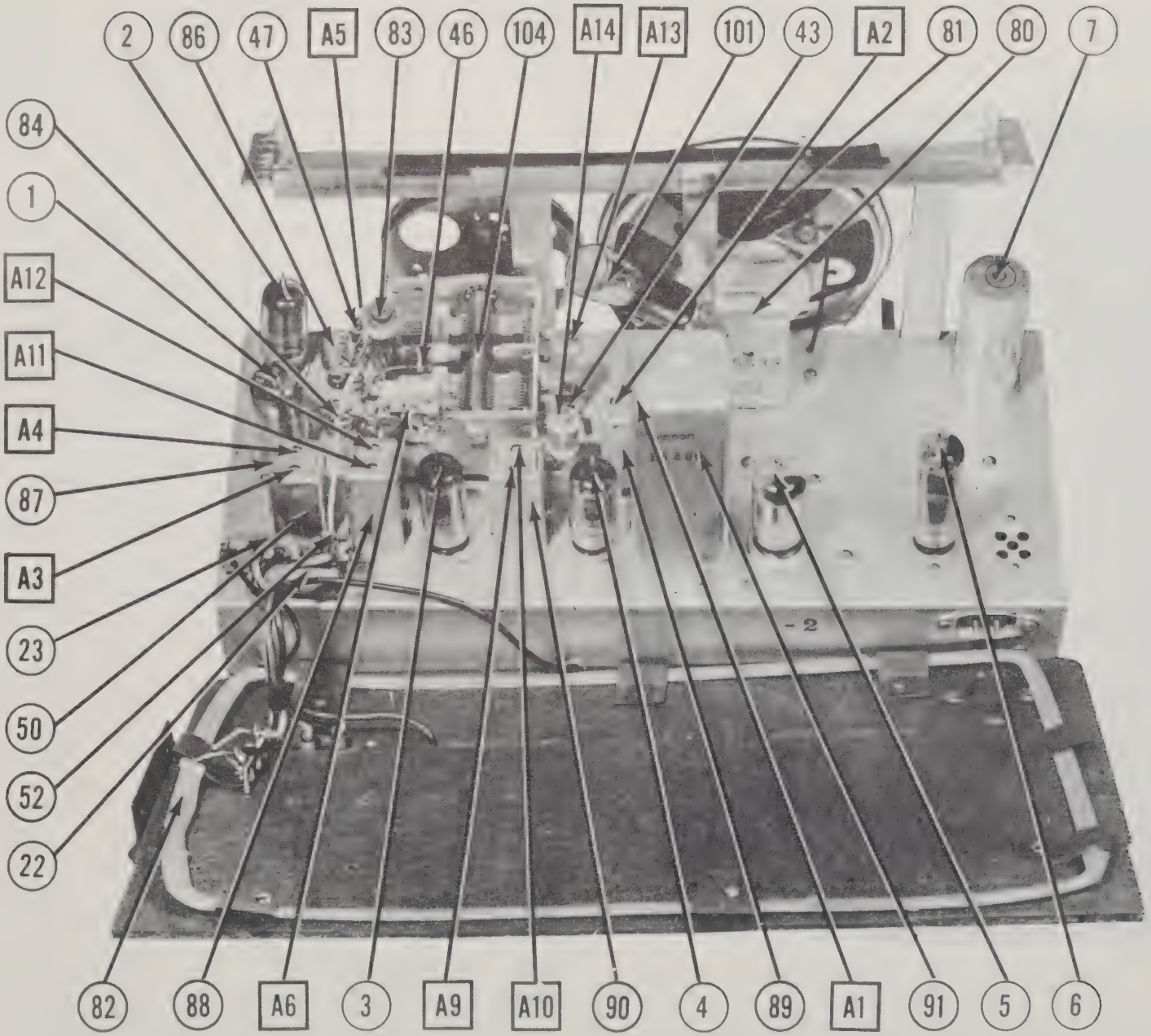
DATE 11/48-#4820-22 SET #50-FOLDER #22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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: WESTINGHOUSE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM RF Amp.-Mixer	12AT7	12AT7	7BT	
2	AM Conv.-FM Osc.	12BE6	12BE6	7CH	
3	1st AM-FM IF	12BA6	12BA6	7BK	
4	2nd FM IF	12BA6	12BA6	7BK	
5	Det.-AVC-AF	19T8	19T8		
6	Power Output	50B5	50B5	7BZ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: WESTINGHOUSE PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	50	150	V-5493		UP5515C	DY-307	EL-352	■ Filter
B	50	150						▲ "
C	20	25						Output Cathode Bypass
8	4	50	V-4637	PRS150/4	BR415	M-4-450	TA-55	Stabilizing Cap.
9	.05	400		484-05	GT4S5	ST-4-05	TC-15	Line Filter
10	.01	200	V-5040-13	484-01	GT2S1	ST-4-01	TC-11	Fil. Bypass
11	.01	200	V-5040-13	484-01	GT2S1	ST-4-01	TC-11	" "
12	.01	200	RCP10M2103M	484-01	GT2S1	ST-4-01	TC-11	Output Plate Bypass
13	.03	400		484-03	GT4S3	ST-6-03	TC-13	Audio Coupling
14	.005	600	RCM10M6502A	684-005	GT6D5	ST-6-005	TC-25	De-emphasis
15	.002	600	RCP10M6202M	684-002	GT6D2	ST-6-002	TC-22	Audio Coupling
16	.01	200	V-5040-13	484-01	GT2S1	ST-4-01	TC-11	FM 2nd IF Decoupling
17	.01	200	V-5040-13	484-01	GT2S1	ST-4-01	TC-11	1st IF Decoupling
18	.002	600	RCP10M6202M	684-002	GT6D2	ST-6-002	TC-22	Audio Coupling
19	.01	200	V-5040-13	484-01	GT2S1	ST-4-01	TC-11	AVC Filter
20	.1	400		484-.1	GT4P1	ST-4-1	TC-1	RF Bypass Pwr. Supply
21	.01	200	V-5040-13	484-01	GT2S1	ST-4-01	TC-11	Converter Decoupling
22	.001	600	RCP10M6102A	684-001	GT6D1	ST-6-001	TC-21	Antenna Coupling
23	.05	400		484-05	GT4S5	ST-4-05	TC-15	Loop Antenna Isolation
24	.05	400		484-05	GT4S5	ST-4-05	TC-15	Vol. Cont. Isolation
25	.02	200	RCP10M2203A	484-02	GT2S2	ST-4-02	TC-12	AVC Filter
26	.01	200	V-5040-13	484-01	GT2S1	ST-4-01	TC-11	AM Conv. Screen Bypass
27	100	500	RCM20A101K	1468-0001	5W5T1	MO.5-31	1FM-31	FM Ant. Coupling
28	5000	300	V-5596	1467-005	1D5D5	MW.5-25	1FM-25	Filament Bypass-Cer.
29	5000	300	V-5596	1467-005	1D5D5	MW.5-25	1FM-25	" " "
30	470	500	R5CC21ZY471M	1468-0005	5W5T5	MO.5-35	1FM-35	" " "
31	470	500	R5CC21ZY471M	1468-0005	5W5T5	MO.5-35	1FM-35	" " "
32	470	500	RCM20A471M	1468-0005	5W5T5	MO.5-35	1FM-35	AF Plate Bypass
33	100	500	RCM20A101M	1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass
34	5000	300	V-5596	1467-005	1D5D5	MW.5-25	1FM-25	AVC Filter-Cer.
35	4.7	500	V-5658-6	1468-000005	5W5V5	MO.5-55	MS-55	IF Coupling-Cer.
36	34	500	V-5658-5	1468-00004	5W5Q5	MO.5-44	1FM-44	" " "
37	68	500	V-5658-4	1469-00007	5W5Q7	MOS.5-47	MS-47	" " "
38	5000	300	V-5596	1467-005	1D5D5	MW.5-25	1FM-25	FM Mixer Decoup.-Cer.
39	100	500	R2CC32CF101K	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling-Cer.
40	100	500	R2CC32CF101K	1468-0001	5W5T1	MO.5-31	1FM-31	" " "
41	100	500	RCM20A101K	1468-0001	5W5T1	MO.5-31	1FM-31	" "
42	470	500	RCM20A471M	1468-0005	5W5T5	MO.5-35	1FM-35	RF Cathode Bypass
43	1	500	V-5658-1	1468-000001				FM Osc. Coupling-Cer.
44	5000	300	V-5596	1467-005	1D5D5	MW.5-25	1FM-25	RF Grid Bypass "
45	470	500	RCM20A471M	1468-0005	5W5T5	MO.5-35	1FM-35	RF Bypass Power Supply
46	10	500	V-5658-7	1469-00001	5R5Q1	MOS.5-41	MS-41	Fixed Trimmer-Cer.
47	15	500	V-5658-8				MS-415	" " "
48	470	500	R5CC20ZY471M	1468-0005	5W5T5	MO.5-35	1FM-35	RF Coupling-Cer.
49	27	500	R2CC25HK270K	1469-000025	5R5Q25	MOS.5-425	MS-425	AM Osc. Coupling-Cer.
50	5000	300	V-5596	1467-005	1D5D5	MW.5-25	1FM-25	Ext. Ground Isol.-"

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: WESTINGHOUSE PART No.	REPLACEMENT DATA: MEISSNER PART No.
82	Loop Ant.		1Ω	V-5638	
83	Ant. Load. Coil		4Ω	V-5605	
84	FM RF Coil		0Ω	V-5546	
85	Osc.Coil-AM		8Ω	V-6078-1	14-1060
86	" " FM		0Ω	V-5545	
87	1st IF-AM	10Ω	9.5Ω	V-5723	
88	" " FM	2Ω	2Ω	V-5540	
89	2nd IF-AM	12Ω		V-5539	
90	2nd IF-FM	2Ω	2Ω	V-5540	
91	FM Det.Tran.	.5Ω	0Ω	V-5538	
92	RF Cath.Chk.		0Ω	V-4886-5	
93	Mixer Plate Choke		0Ω	V-4886-6	
94	RF Plate Choke		1.5Ω	V-4886-4	
95	Conv. Cath. Choke		1Ω	V-4886-1	
96	Osc. Grid Choke		0Ω	V-4886-7	
97	Conv. Grid Choke		0Ω	V-4886-8	
98A	Line Choke		0Ω	V-5743	
B	" "		0Ω		
99	Fil. Choke		0Ω	V-4886-2	
100	" "		0Ω	V-4886-2	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: WESTINGHOUSE PART No.	REPLACEMENT DATA	INSTALLATION NOTES
101	Screw	120	.05A				Type #6S6.

MISCELLANEOUS

ITEM No.	PART NAME	WESTINGHOUSE PART No.	NOTES
102	Switch	V-5534	Band
103	Rectifier	V-6070	Selenium (100MA)
104	2 Gang Var. Cap.	V-5494	(17-430MMF, 25-170MMF)
A6	Trimmer	V-4992	BC Ant. Adj.
	Dial Pointer	V-6119	
	Dial	V-5523	
	Cabinet	V-1153-1	(H-202 Ivory)
	"	V-1153-2	(H-202 Brown)
	"	V-1153-3	(H-204 Green)

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	WESTING. PART No.	IRC PART No.	CLAROSTAT PART No.	
51A	1 Meg.	½	V-5517	D13-137	M-63-Z	Volume Control#
B	Shaft		Not Req.	A	Not Req.	Attach to 51A per instructions
C	Switch		" "	41.	SW-A	" " " " "

#Use original insulation washers to isolate control from chassis.

RESISTORS

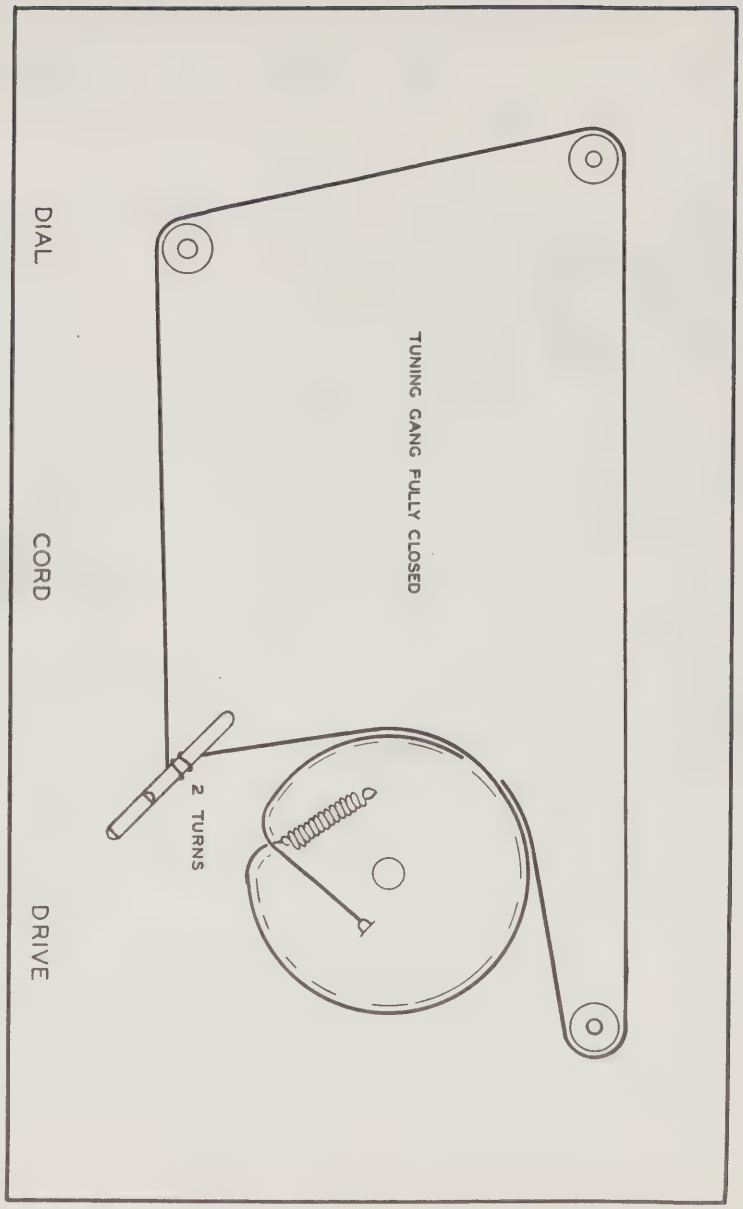
ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	WESTINGHOUSE PART No.	IRC PART No.	
52	2200Ω	½	RC20AE222M	BTS-2200	Red-Red-Red Antenna Loading
53	220Ω	½	RC20AE221K		Red-Red-Br. FM-RF Cathode
54	470KΩ	½	RC20AE474M	BTS-470K	Yl.-Vi.-Yl. FM-RF Grid
55	1 Meg.	½	RC20AE105M	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
56	470KΩ	½	RC20AE474M	BTS-470K	Yl.-Vi.-Yl. Mixer Grid
57	470Ω	½	RC20AE471K	BTS-470	Yl.-Vi.-Br. Conv. Decoupling
58	22KΩ	½	RC20AE223K	BTS-22K	Red-Red-Or. Oscillator Grid
59	1 Meg.	½	RC20AE105M	BTS-1 Meg.	Br.-Blk.-Grn. Converter Grid
60	2.7 Meg.	½	RC20AE275M	BTS-2.7 Meg.	Red-Vi.-Grn. AVC Network
61	470KΩ	½	RC20AE474M	BTS-470K	Yl.-Vi.-Yl. Diode Load
62	470Ω	½	RC20AE471K	BTS-470	Yl.-Vi.-Br. Converter Screen Decoupling
63	120Ω	½	RC20AE121K		Br.-Red-Br. 1st IF Cathode
64	1000Ω	½	RC20AE102K	BTS-1000	Br.-Blk.-Red 1st IF Decoupling
65	180KΩ	½	RC20AE184K	BTS-180K	Br.-Gray-Yl. 2nd IF Transformer Shunt
66	120Ω	½	RC20AE121K		Br.-Red-Br. FM 2nd IF Cathode
67	1000Ω	½	RC20AE102K	BTS-1000	Br.-Blk.-Red FM 2nd IF Decoupling
68	22KΩ	½	RC20AE223M	BTS-22K	Red-Red-Or. De-emphasis
69	10KΩ	½	RC20AE103J	BTS-10K	Br.-Blk.-Or. Ratio Detector Diode Load
70	10KΩ	½	RC20AE103J	BTS-10K	Br.-Blk.-Or. " " " "
71	470KΩ	½	RC20AE474M	BTS-470K	Yl.-Vi.-Yl. AVC Network
72	10 Meg.	½	RC20AE106M	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
73	470KΩ	½	RC20AE474M	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
74	470KΩ	½	RC20AE474M	BTS-470K	Yl.-Vi.-Yl. Output Grid
75	180Ω	½	RC20AE181K	BW-½-180	Br.-Gray-Br. Output Cathode
76	1000Ω	2	RC40AE102K	BT-2-1000	Br.-Blk.-Red Filter
77	47Ω	2	V-6067-2	BW-2-47	Yl.-Vi.-Blk. Rectifier Ballast
78	1000Ω	2	RC40AE102K	BT-2-1000	Br.-Blk.-Red Series Pilot Light

TRANSFORMER (OUTPUT)

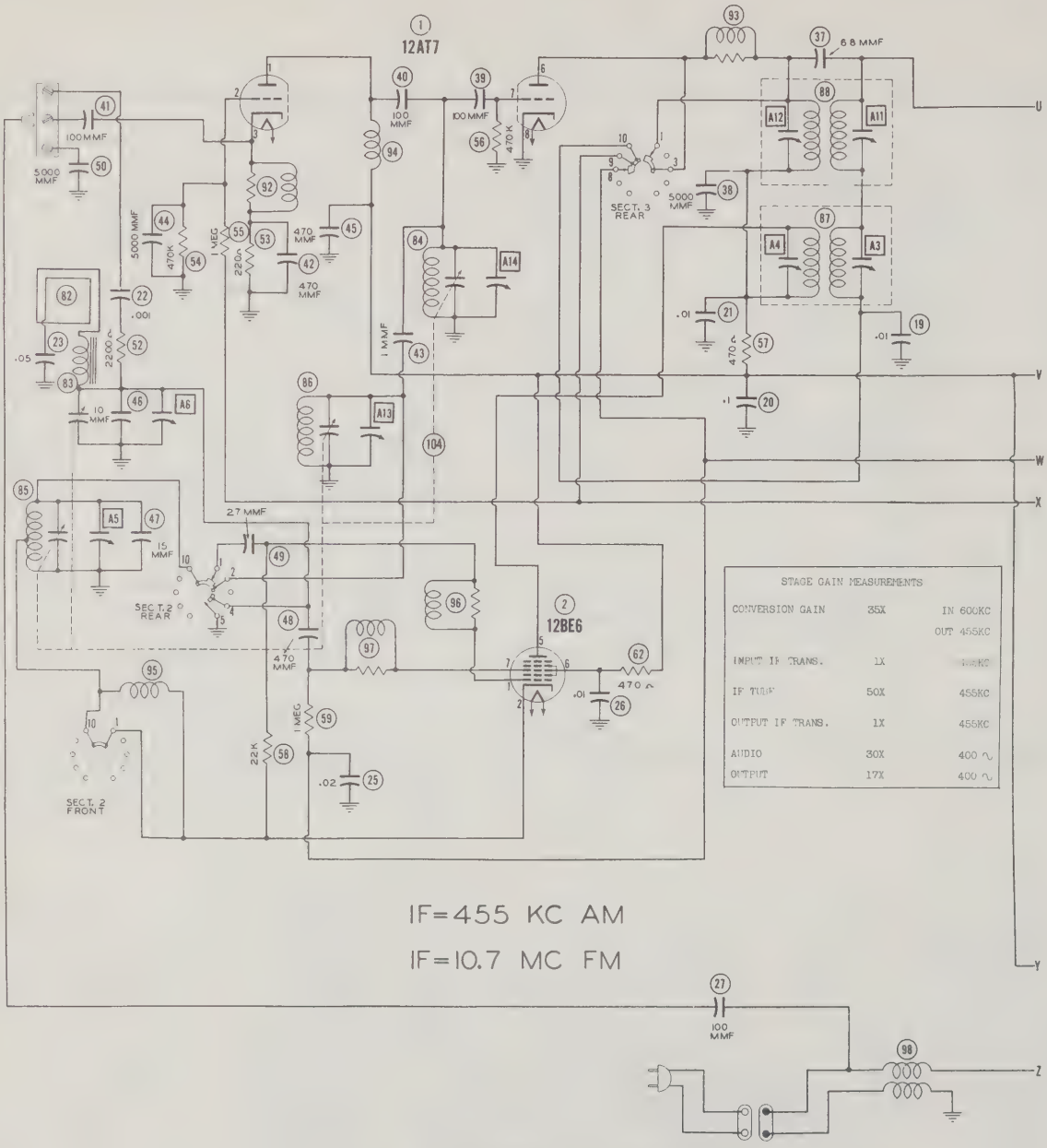
ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		WESTINGHOUSE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
79	1900Ω	3.1Ω	235Ω tapped @ 14Ω	.5Ω	V-5537	A-3330		A-3031	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			WESTINGHOUSE PART No.	JENSEN PART No.	QUAM PART No.	
80	FIELD PM	VC IMP. 3.1Ω	V-5533	ST-105† Mod. P5-X	5A07†	†Fabricate new mounting bracket.
81	CONE DIA. 4½"	VC DIA. 9/16"				



DATE 11/49-#4820-22 SET #50-FOLDER #22



IF=455 KC AM

IF=10.7 MC FM

STAGE GAIN MEASUREMENTS

CONVERSION GAIN	35X	IN 600KC OUT 455KC
INPUT IF TRANS.	1X	[illegible] KC
IF TUBE	50X	455KC
OUTPUT IF TRANS.	1X	455KC
AUDIO	30X	400 ∿
OUTPUT	17X	400 ∿

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
‡ 1	12AT7	85VDC	-.2VDC	.6VDC	24VAC	12VAC	85VDC	-.[illegible]	[illegible]	[illegible]
2A	12BE6	-7VDC§	0V.	12VAC	0V.	85VDC	85VDC	-.[illegible]	-	-
‡ 2B	12BE6	-2.6VDC§	[illegible]	12VAC	0V.	55VDC	85VDC	-.[illegible]	[illegible]	-
3	[illegible]	-.2VDC	0V.	45VAC	55VAC	80VDC	80VDC	[illegible]	-	-
‡ 4	[illegible]	0V.	0V.	55VAC	67VAC	80VDC	80VDC	1.3VDC	-	-
5	[illegible]	-.6VDC	+1.1VDC	-.6VDC	24VAC	45VAC	-.0VDC	0V.	-.5VDC	40VDC
6	[illegible]	0V.	6VDC	67VAC	117VAC	120VDC	85VDC	0V.	-	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

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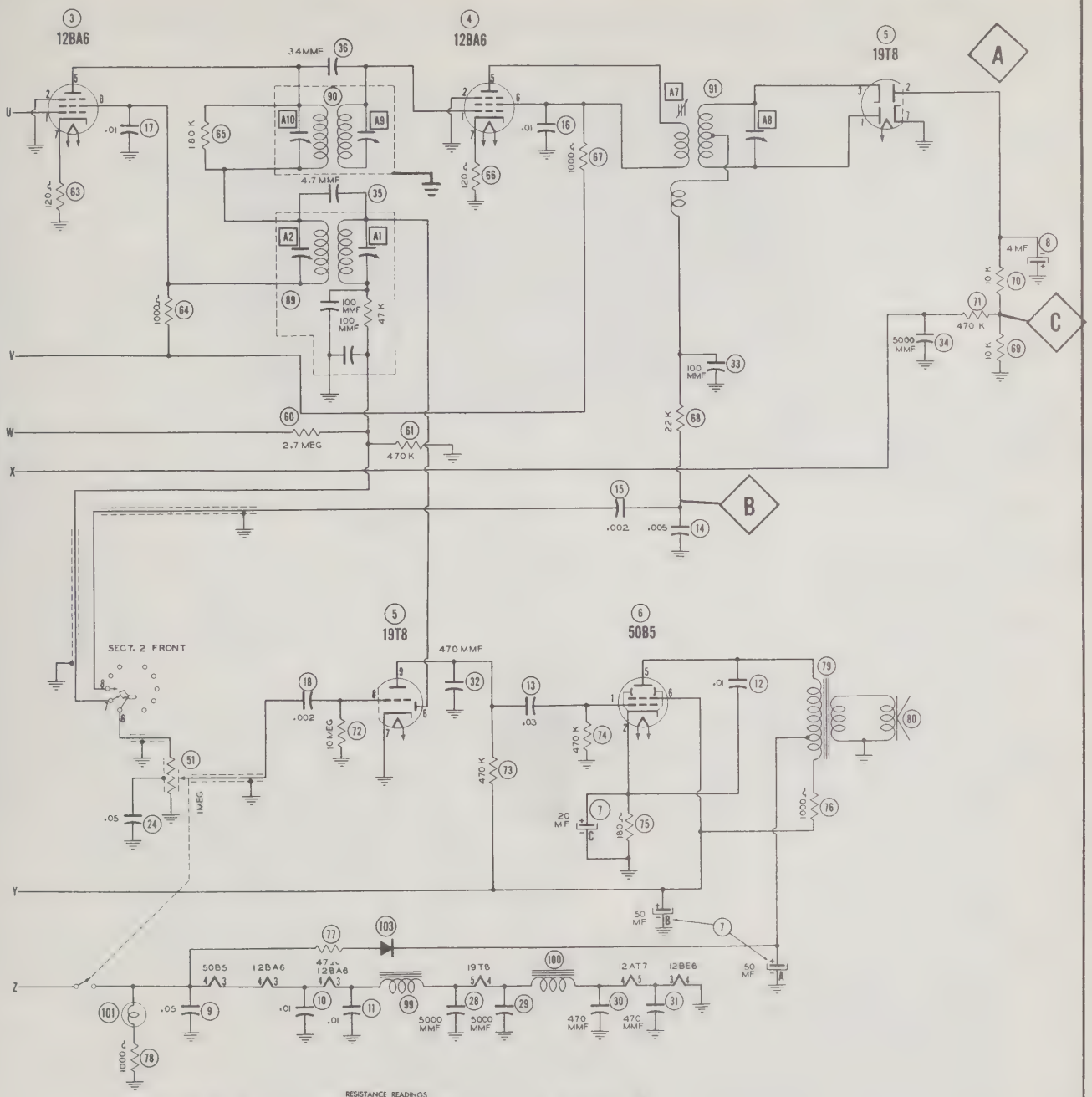

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
‡ 1			400KΩ	220Ω	23Ω	11Ω	3KΩ	470KΩ		
2A	12BA6		2Ω	11Ω	0Ω	3KΩ	3KΩ	4.1 Meg.	-	-
‡ 2B	12BA6			11Ω		3KΩ	3KΩ	4.1 Meg.	-	-
3		2.1 Meg.				4KΩ	4KΩ	120Ω	-	-
‡ 4	12BA6					4KΩ	4KΩ	120Ω	-	-
5	19T8	INF.	20KΩ	INF.	23Ω	42Ω	520KΩ	0Ω	10 Meg.	
6			180Ω	65Ω	105Ω	2KΩ	3KΩ	470KΩ	-	-

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and B-.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 1 (grid) of 12BA6 1st IF Tube (3). Low side to chassis.	455KC	AM (Counter-clock-wise)	Tuning cap. fully open.	Across voice coil	A1,A2,	Adjust for maximum output. If isolation transformer is not used reduce dummy antenna to .001 MFD. to reduce hum modulation.
2	.1 MFD.	High side to rear AM stator of tuning cap. Low side to chassis.	"	"	"	"	A3,A4	Adjust for maximum output.
3		Loop	1615KC	"	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust A5 for maximum output.
4		"	1400KC	"	Tune for maximum output.	"	A6	Adjust for maximum output.

FM ALIGNMENT

Do not attempt alignment of FM IF's until AM Alignment is completed.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Do not attempt to adjust A7, A8, A9 or A10 with signal generator connected as in Step 8.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5	.002MFD	High side to Pin 1 (grid) of 12BA6 FM 2nd IF Tube (4). Low side to chassis.	10.7MC (Unmodulated)	FM (clock-wise)	Tuning cap. fully open.	DC probe to Point Ⓐ. Common to chassis	A7	Adjust for maximum deflection. Adjust signal generator output to give deflection of 2.5 volts. Do not change for next step.
6	.002MFD	"	"	"	"	DC probe to Point Ⓑ. Common to Point Ⓒ.	A8	Adjust for zero deflection. Repeat Step 5.
7	.002MFD	High side to Pin 1 (grid) of 12BA6 1st IF Tube (3). Low side to chassis.	"	"	"	DC probe to Point Ⓐ. Common to chassis	A9,A10	Adjust for maximum deflection.
8	.002MFD	High side to Pin 7 (grid) of 12AT7. Low side to chassis.	"	"	"	"	A11, A12	Adjust for maximum deflection. Continue with FM-RF Alignment in Step 9.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.
Do not attempt to adjust A7, A8, A9 or A10 with signal generator connected as in Step 6.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5	.01 MFD.	High side to Pin 1 (grid) of 12BA6 1st IF Tube (3). Low side to chassis.	10.7MC (Freq. Modulated)	FM (clock-wise)	Tuning cap. fully open.	Vertical input to Point Ⓐ. Ground to chassis.	A7,A9, A10	Disconnect 4 MFD cap. Ⓑ from Point Ⓐ. Adjust A7, A9 & A10 for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
6	.01 MFD.	High side to Pin 7 (grid) of 12AT7. Low side to chassis.	"	"	"	"	A11, A12	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1. Reconnect cap. Ⓑ to Point Ⓐ.
7	.01 MFD	High side to Pin 1 (grid) of 12BA6 1st IF Tube (3). Low side to chassis.	"	"	"	Vertical input to Point Ⓑ. Ground to Point Ⓒ.	A8	Adjust for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Continue with FM-RF Alignment in Step 9.

FM RF ALIGNMENT

To check dial calibration, turn tuning cap. fully closed and tune signal generator for maximum deflection. If signal gen. freq.is 88MC the following may be omitted. If sig. generatorfreq. is higher than 88MC, slightly compress the FM Osc. Coil (86). If signal generator frequency is lower than 88MC, slightly expand the FM Osc. Coil. Repeat the adjustments at 88MC and 108MC until no further improvement can be made.

Set signal generator at 90MC and tune receiver for maximum deflection. Adjust A14 for maximum deflection. If the setting of A14 is the same at 90MC as it was at 105MC the following may be omitted. If capacity of A14 must be increased, slightly compress the FM Ant. Coil (84). If capacity of A14 must be decreased, slightly expand the FM Ant. Coil. Repeat adjustments at 105MC and 90MC until no further improvement can be made.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9	300Ω carbon res.	High side to FM Ant. terminal. Low side to ground terminal.	108MC (Unmodulated)	FM (Clock-wise)	Tuning cap. fully open.	DC probe to Point Ⓐ. Common to chassis.	A13	Adjust for maximum deflection. Check calibration per prealignment instructions.
10	"	"	105MC (Unmodulated)	"	Tune for maximum deflection.	"	A14	Rock tuning cap. and adjust for maximum deflection. Check adjustment of FM-RF Coil per prealignment instructions. If coils are adjusted repeat Steps 9 & 10 until no further improvement can be made.

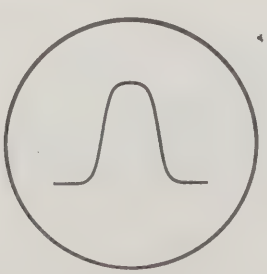


FIG. 1

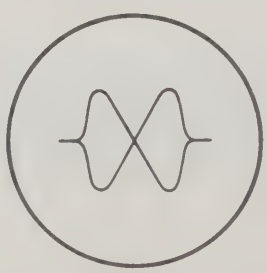
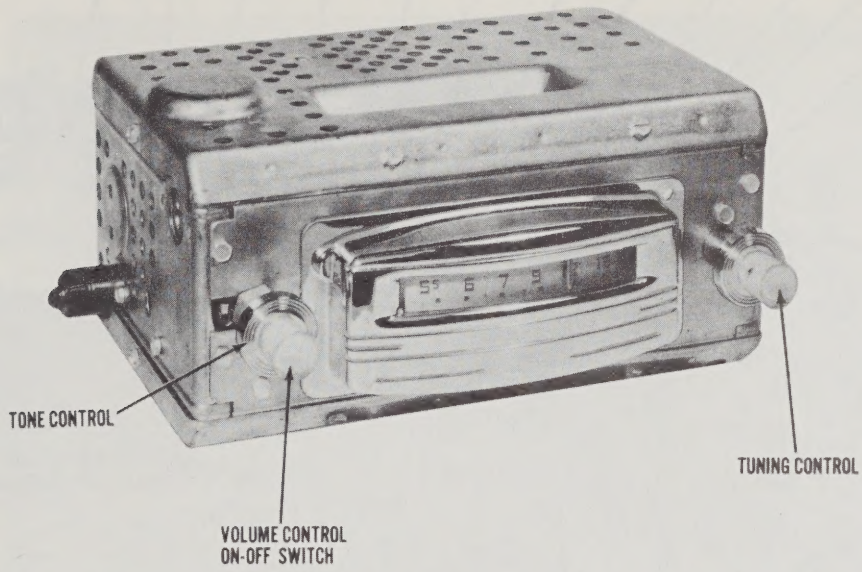


FIG. 2

WILLYS-OVERLAND
MODEL 8030



WILLYS-OVERLAND MODEL 8030

TRADE NAME	Willys-Overland, Model 8030
SUPPLIER	Willys-Overland Motors, Toledo, Ohio
TYPE SET	Battery Operated Custom-Built Automotive Superheterodyne Reieiver
TUBES (SIX)	Types, 7A7 RF Amp., 7B8 Converter, 7A7 IF Amp., 7B6 Det.-AVC-AF, 7C5 Power Output, 7Y4 Rectifier.
POWER SUPPLY	6 Volt Storage Battery
TUNING RANGE—BROADCAST	540-1600KC RATING 6.1 Amp. @ 6.3 Volts DC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Connect 30 MMFD cap. from antenna socket to chassis. High side of sig. gen. in series with 30 MMFD cap. to antenna socket.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 6 (grid) of 7B8. Low side to chassis.	265KC	Tuning control fully counter-clockwise	Across voice coil	A1,A2, A3,A4	Adjust for maximum output.
2	See pre-alignment instructions	High side to dummy antenna. Low side to chassis.	1605KC	"	"	A5,A6, A7	" " " "
3	"	"	1400KC	Tuner carriage 3/8" from high freq. end.	"	A8,A9, A10	Adjust for maximum output. Set dial pointer to 1400KC on dial.
4	"	"	600KC	Tune for maximum output.	"	A11	Rock tuning control and adjust for maximum output. Repeat Steps 2, 3 and 4 until no further improvement can be made.
	Follow the procedure outlined below if a core or coil has been replaced.						
5	See pre-alignment instructions	High side to dummy antenna. Low side to chassis.	1675KC	Tuning control fully counter-clockwise	Across voice coil	A5,A6, A7	Turn A8, A9, & A10 completely counter-clockwise. (Do not permit cores to drop out of coil forms). Adjust A5, A6, A7 for maximum output.
6	"	"	1400KC	Tuner carriage 3/8" from high freq. end.	"	A8,A9, A10	Adjust for maximum output. Set dial pointer to 1400KC on dial.
7	"	"	600KC	Tune for maximum output.	"	A11	Rock tuning control and adjust for maximum output. Repeat Steps 5, 6 & 7 until no further improvement can be made.
8	"	"	1605KC	Tuning control fully counter-clockwise.	"		Bend mechanical stop to limit freq. range to this frequency.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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PARTS LIST AND DESCRIPTIONS

WILLYS-OVERLAND
MODEL 8030

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: DETROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	7A7	7A7	8V	
2	Converter	7B8	7B8	8X	
3	IF Amp.	7A7	7A7	8V	
4	Det.-AVC-AF	7B6	7B6	8W	
5	Power Output	7C5	7C5	6AA	
6	Rectifier	7Y4	7Y4	5AB	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: DETROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	20	350		AF32K4A	UP11135#		EL-212†	■ Filter
B	10	300						▲ "
8	.5	120				SHH-1		Hash Filter
9	.5	120				SHH-1		" "
10	.008	1600		1684-0075	MD16D8	STM-16-008	TR-28	Buffer
11	.005	600		684-005	DT6D5	ST-6-005	TC-25	Output Plate Bypass
12	.003	600		684-003	DT6D3	ST-6-003	TC-23	Tone Compensation
13	.02	600		684-02	DT6S2	ST-6-02	TC-12	" "
14	.1	200		484-.1	DT4P1	ST-2-1	TC-1	Screen Decoupling
15	.05	200		484-05	DT4S5	ST-4-05	TC-15	AVC Filter
16	.01	400		484-01	DT4S1	ST-4-01	TC-11	RF Coupling
17	.01	300		484-01	DT4S1	ST-4-01	TC-11	Audio Coupling-Cer.-Note
18	220	300		1468-0002	5W5T2	MO.5-32	1FM-32	AF Plate Bypass "
19	5000	300		1467-005	1D5D5	MW.5-25	1FM-25	Audio Coupling "
20	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap. "
21	350	300						Fixed Trimmer "
22	250	500		1469-00025	5R5T25	MOS.5-325	MS-325	" "
23	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling "
24	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Fixed Trimmer

Note-Items #17 and 35 are combined in one unit.
#-Parallel sections to obtain desired capacity.
†-Omit bypass section.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DETROLA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
25A	250KΩ	½	B55582-1	--		Volume Control & Sw. tapped @ 100KΩ
B	1.5 Meg.	½				Tone Control

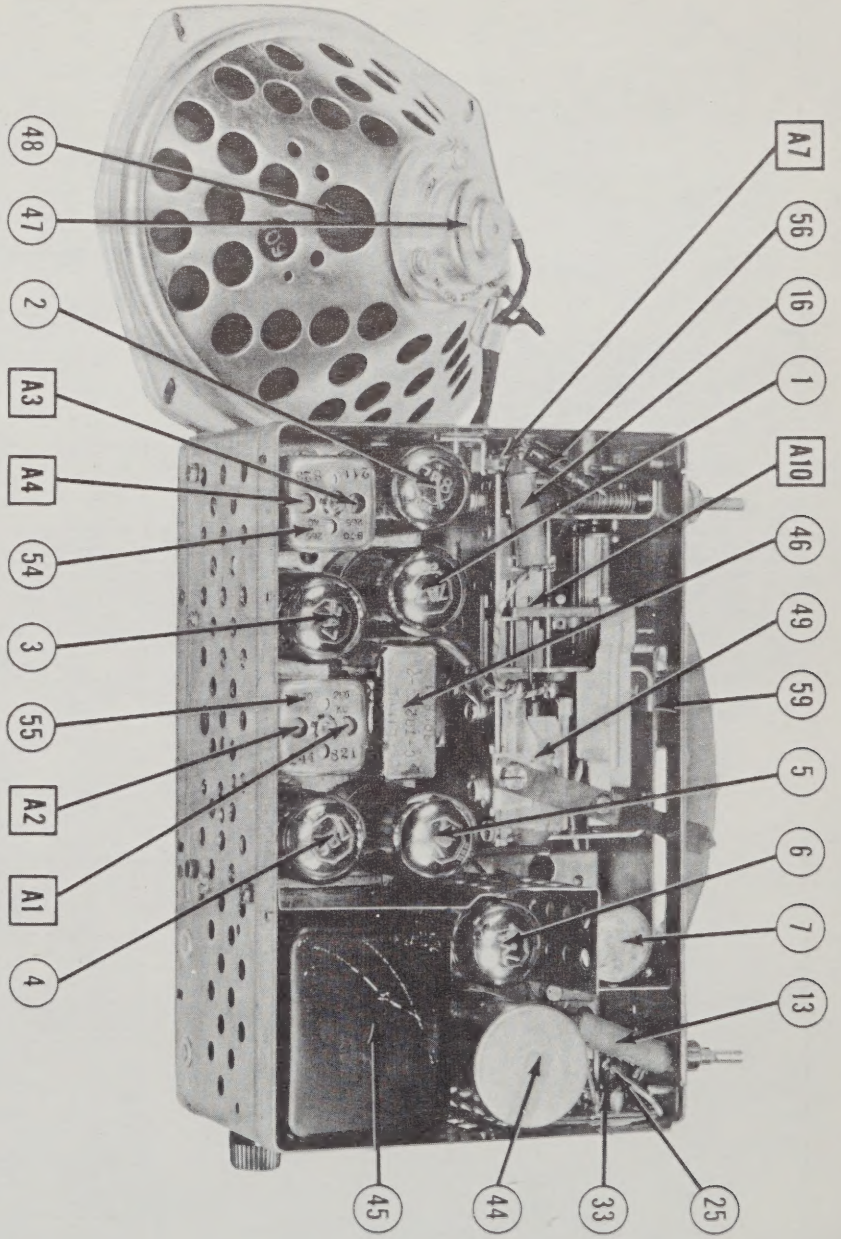
Note-This is a dual control with a concentric shaft.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DETROLA PART No.	IRC PART No.	IDENTIFICATION CODES
26	330KΩ	½		BTS-330K	Or.-Or.-Yl. RF Grid
27	18KΩ	½		BTS-18K	Br.-Gray-Or. RF Plate Load
28	330KΩ	½		BTS-330K	Or.-Or.-Yl. Conv. Grid
29	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Osc. Grid
30	15KΩ	½		BTS-15K	Br.-Grn.-Or. Osc. Anode Load
31	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
32	33KΩ	1		BTA-33K	Or.-Or.-Or. Screen Dropping
33	22KΩ	½		BTS-22K	Red-Red-Or. Tone Comp.
34	15 Meg.	½		BTS-15 Meg.	Br.-Grn.-Blue AF Grid
35	330KΩ	½		BTS-330K	Or.-Or.-Yl. AF Plate Load-See Note
36	330KΩ	½		BTS-330K	Or.-Or.-Yl. Output Grid
37	270Ω	1		BW-1-270	Red-Vi.-Br. Output Cathode
38	1800Ω	2		BT-2-1800	Br.-Gray-Red Filter
39	82Ω	½		BW-½-82	Gray-Red-Blk. Hash Suppressor
40	82Ω	½		BW-½-82	Gray-Red-Blk. " "
41	220Ω	½		BW-½-220	Red-Red-Br. RF Cathode
42	180Ω	½		BW-½-180	Br.-Gray-Br. Conv. Cathode
43	15 Meg.	½		BTS-15 Meg.	Br.-Grn.-Blue Conv. Grid

Note-Items 35 & 17 are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA: DETROLA PART No.	REPLACEMENT DATA: RADIART PART No.	INSTALLATION NOTES
44	Interrupter	6.3V DC	115∿	B-70347	5301	

TRANSFORMER (VIBRATOR)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: DETROLA PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.
45	6.3V DC @ 3.0A	465V CT .05A DC			DC-70267-C			

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: DETROLA PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
46	5500Ω	3.2Ω	500Ω	.5Ω	DC-70264	A-3856*	T22846*	A-2930*	*Bend mounting tabs down.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: DETROLA PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.				
47	PM	3.2Ω			69A3	
	CONE DIA.	VC DIA.				
48	6"x9"	3/4"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: DETROLA PART No.	REPLACEMENT DATA: MEISSNER PART No.	
49	Ant. Coil		12Ω			Item #49, 50 & 51 are ganged together and are slug tuned.
50	RF Coil		12Ω			
51	Osc. Coil		2.3Ω			
52	Osc. Shunt Coil		8Ω			
53	Osc. Series Coil		1Ω			
54	Input IF	63Ω	64Ω			
55	Output IF	63Ω				
56	Ant. Choke		.1Ω			
57	Vib. Choke		0Ω			
58	Hash Choke		0Ω			

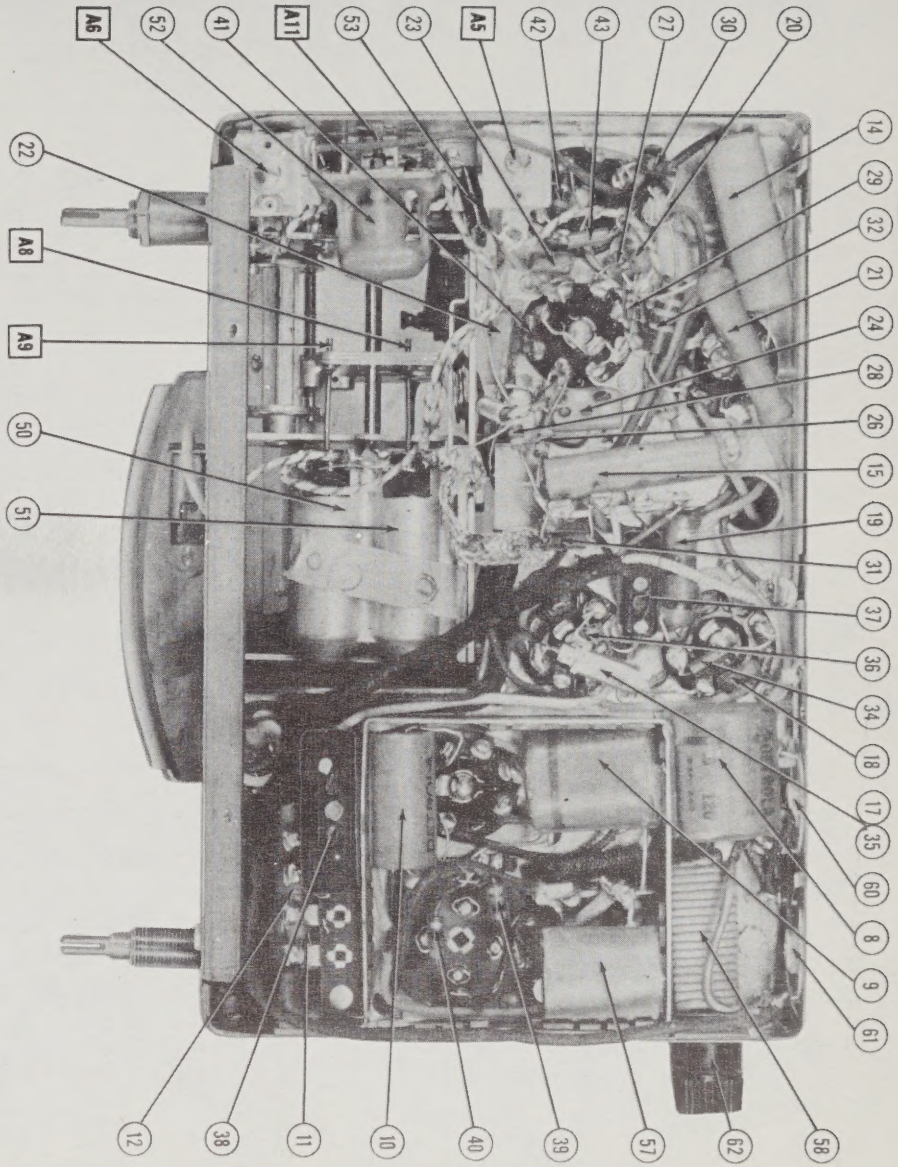
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: DETROLA PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
59	Bayonet	7.5	0.2	White			Type 51

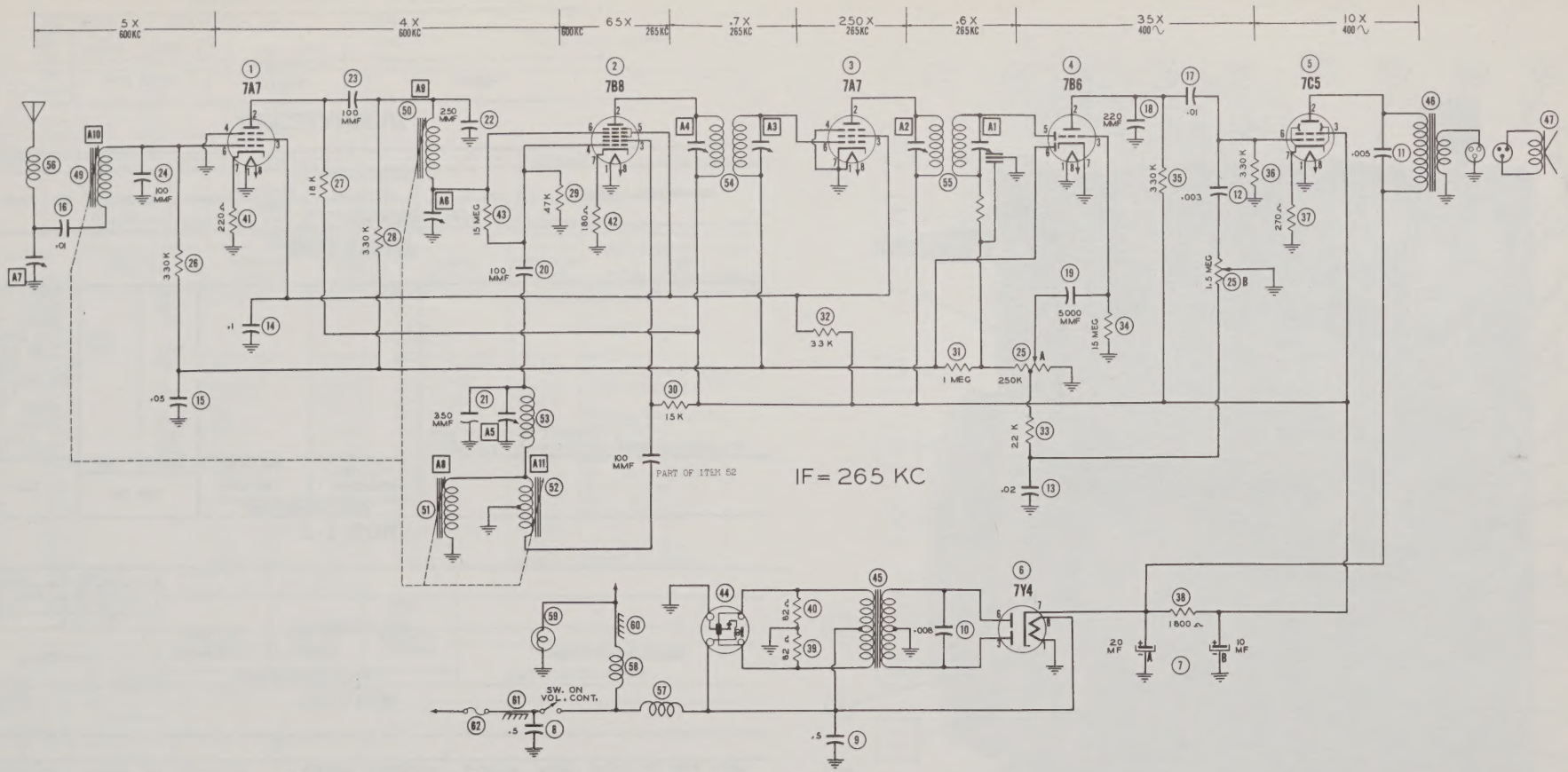
MISCELLANEOUS

ITEM No.	PART NAME	DETROLA PART No.	NOTES
60	Spark Plug		
61	" "		
62	Fuse		9 Amp.

CHASSIS—BOTTOM VIEW



WILLYS-OVERLAND MODEL 6030



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A7	6.3VDC	95VDC	50VDC	0V.	0V.	0V.	.7VDC	0V.
2	7B8	0V.	200VDC	155VDC	-16VDC§	50VDC	-.2VDC	1VDC	6.3VDC
3	7A7	6.3VDC	200VDC	80VDC	0V.	0V.	-.2VDC	0V.	0V.
4	7B6	6.3VDC	90VDC	-.2VDC	0V.	-.2VDC	-.2VDC	0V.	0V.
5	7C5	6.3VDC	220VDC	200VDC	0V.	0V.	0V.	10VDC	0V.
6	7Y4	0V.	0V.	233VAC	0V.	0V.	233VAC	240VDC	6.3VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A7	.1Ω	250KΩ	260KΩ	0Ω	0Ω	1.6 Meg.	220Ω	0Ω
2	7B8	0Ω	230KΩ	240KΩ	47KΩ	260KΩ	15 Meg.	180Ω	.1Ω
3	7A7	.1Ω	230KΩ	260KΩ	0Ω	0Ω	1.2 Meg.	0Ω	0Ω
4	7B6	.1Ω	560KΩ	15 Meg.	0Ω	1.2 Meg.	290KΩ	0Ω	0Ω
5	7C5	.1Ω	230KΩ	230KΩ	INF.	INF.	330KΩ	270Ω	0Ω
6	7Y4	0Ω	INF.	400Ω	INF.	INF.	350Ω	230KΩ	.1Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4820-23

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 6.3 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.